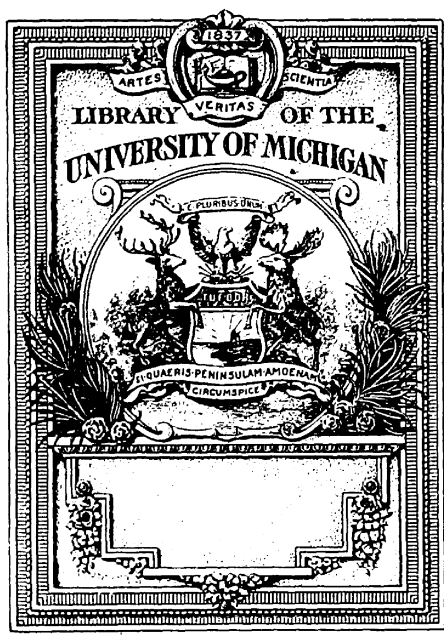


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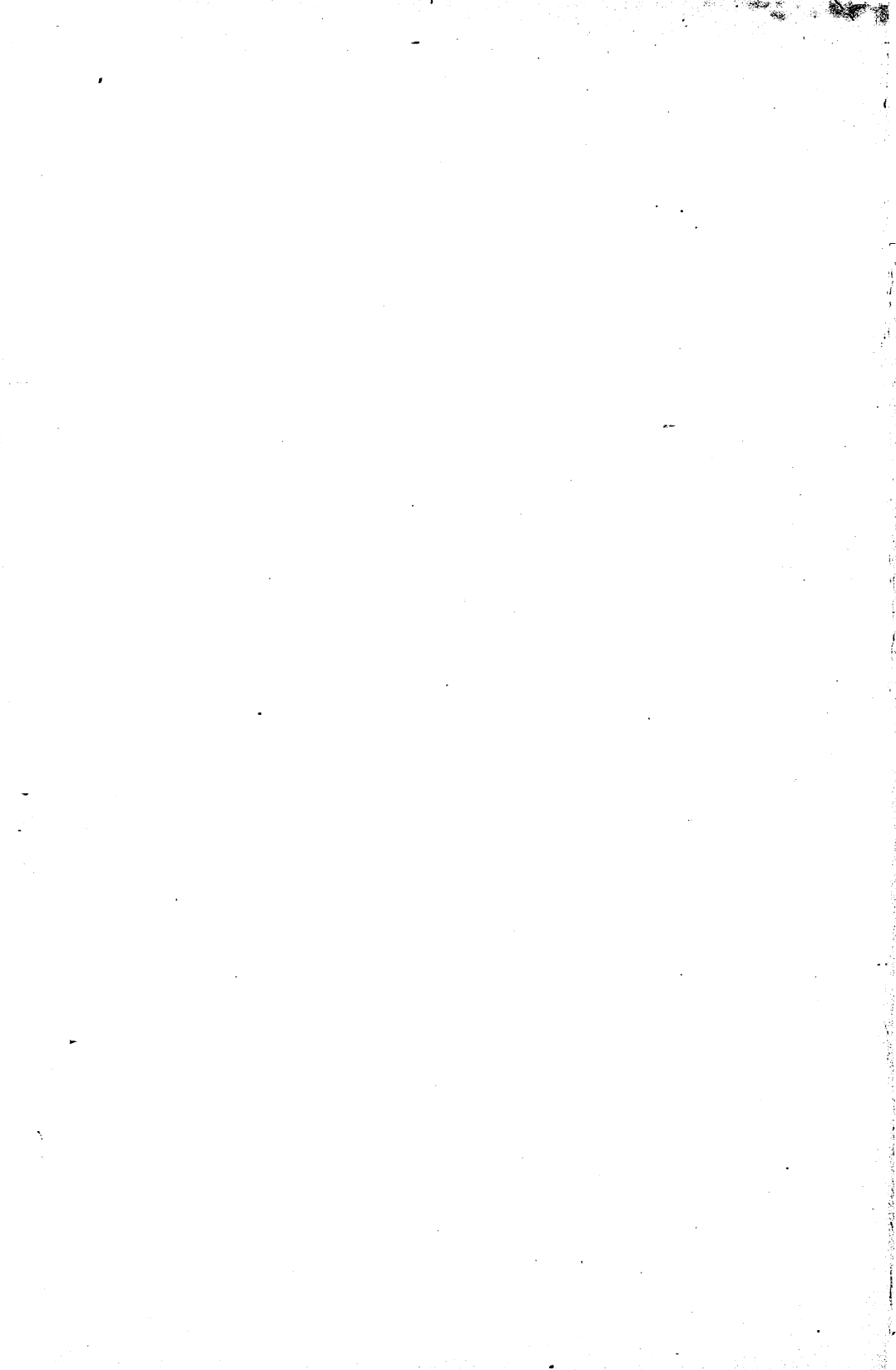
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THE
SCIENCE AND ART
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SURGERY,
EMBRACING
MINOR AND OPERATIVE SURGERY:
COMPILED FROM STANDARD ALLOPATHIC AUTHORITIES,
AND ADAPTED TO
HOMŒOPATHIC THERAPEUTICS,

WITH
A GENERAL HISTORY OF SURGERY FROM THE EARLIEST PERIODS TO THE
PRESENT TIME, FOR THE USE OF PRACTITIONERS AND STUDENTS
OF THE HOMŒOPATHIC PRACTICE OF MEDICINE,

BY
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GRADUATE OF THE MEDICAL UNIVERSITY OF THE CITY OF NEW YORK, SURGEON OF
VOLUNTEERS DURING THE REBELLION, PROFESSOR OF SURGERY IN THE HOMŒ-
OPATHIC MEDICAL COLLEGE OF MISSOURI, SURGEON TO THE GOOD
SAMARITAN HOSPITAL, AND PRESIDENT OF THE
WESTERN INSTITUTE OF HOMŒOPATHY,

Illustrated by new and copious Engravings and many original
Cuts from the Author's private Museum.

IN TWO VOLUMES.

VOL. I.

ST. LOUIS:
MISSOURI DEMOCRAT BOOK AND JOB PRINTING ESTABLISHMENT,
1867.



TO THE
HOMŒOPATHIC PRACTITIONERS OF AMERICA, AND ESPECIALLY
TO THE
STUDENTS OF THE HOMŒOPATHIC MEDICAL COLLEGE OF MISSOURI,
THIS WORK IS RESPECTFULLY DEDICATED,
BY
THE AUTHOR.

"Similia Similibus Curantur."

PREFACE.

IN preparing for publication the present treatise on the SCIENCE AND ART OF SURGERY, the author has endeavored faithfully and impartially to adapt the homœopathic law of cure to the treatment of surgical diseases, and to supply a desideratum long felt by practitioners and students in our surgical literature.

The rapid increase of homœopathy, the constant demand made upon the science for additional laborers in this field of practice, the multiplication of medical colleges, and the continually-augmenting classes of students that throng these halls of learning, are sufficient evidences of the exalted position and standing of homœopathy in the social scale.

Within the past few years, the adaptation of the law "similia" to the cure of surgical diseases has received a powerful and irresistible impulse by the labors of those who justly occupy a proud position in its ranks as accomplished and successful surgeons.

The jeers and hackneyed jokes of allopathic practitioners, and their coarse denunciations of this system, have, like chickens in the proverb, "come home to roost;" and homœopathic surgery, crowned with brilliant and successive triumphs,

Moves onward, still onward, a giant now—
"Excelsior" forever 'graven on its brow.

The records of the late rebellion, the statistics of thousands of cases both in civil and military service, the published transactions of its literature, potently attest that homœopathic surgeons can not only perform surgical operations skillfully, but results prove that the success attending operative interference is largely

in favor of that system of practice. Besides this, a number of diseases that under allopathic remedies are pronounced incurable, are readily and permanently cured by the principle of similars. The unbeliever, if he will, can find in the literature of the homœopathic school, abundant and well-attested evidences of the truth of this statement.

It is the design of the author in the present work to keep pace with the onward march of surgical improvement, and to present practitioners and medical students a treatise in this department of medicine both plain and comprehensive—one that will obviate the necessity forced upon us, of employing allopathic text-books in the curriculum of study in our medical colleges.

In compiling, arranging, and systematizing this work to the requirements of the homœopathic practice, the standard surgical authorities have been largely consulted, and all improvements and valuable suggestions have been carefully appropriated. The description and pathological characteristics of disease are culled from the most approved authors. The treatment, however, is homœopathic, and embodies the researches and clinical observations of the most skillful practitioners of our art, as well as the practical teachings of twenty years' experience of the author.

It is regretted, however, in this connection, that a more willing response has not met the request for "communications from the profession touching the treatment of surgical diseases," as much precious and valuable information must necessarily be lost to practitioners of our school of medicine. The hope is still indulged, however, that such "communications" may yet be forwarded, to take their places in proper order in the subsequent parts of the work.

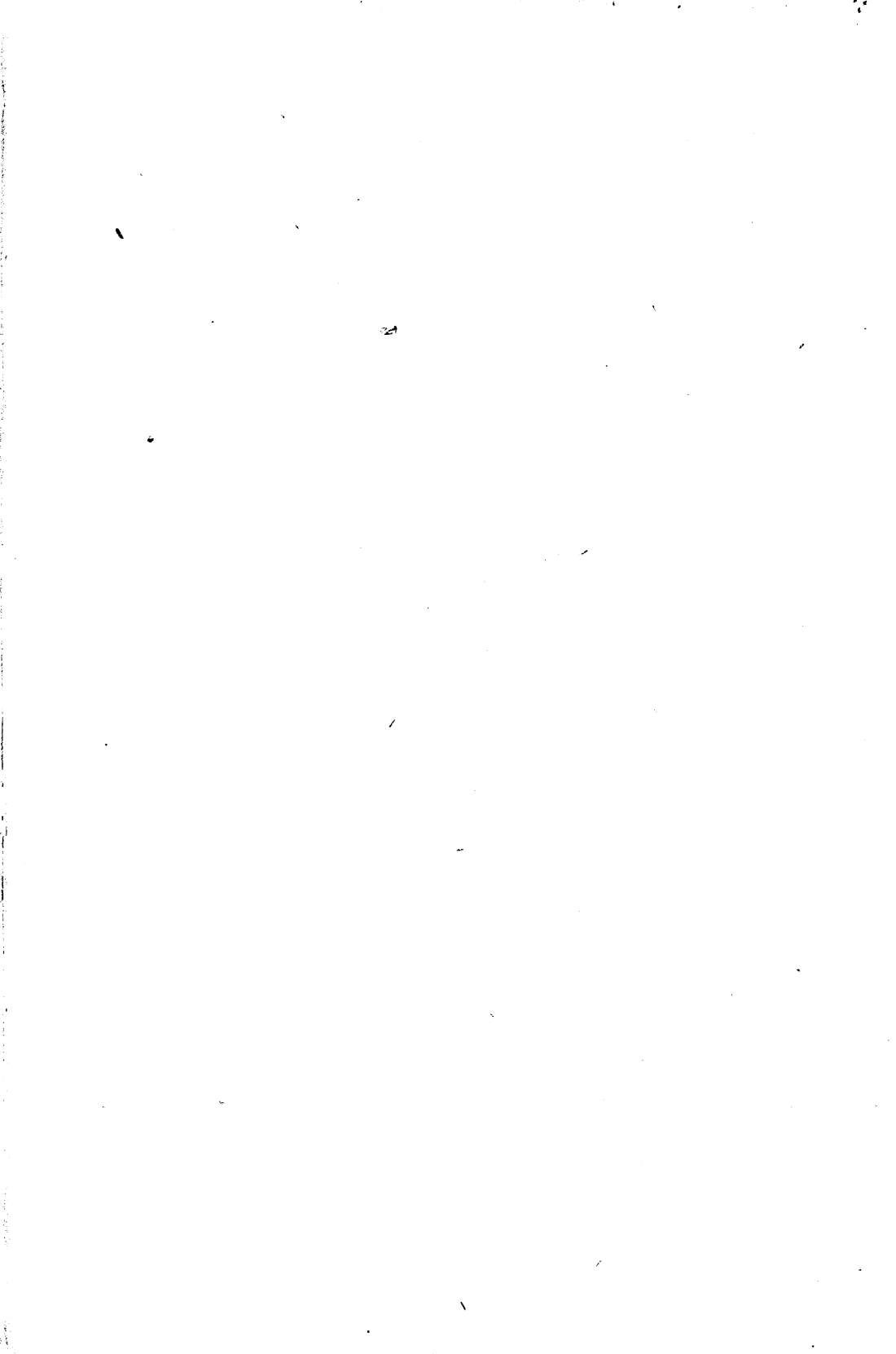
The publication of this treatise is a fixed fact, and the material is nearly completed, for which no apology need be offered, as it is the aim and ambition of the author solely to supply an acknowledged deficiency in this department of medicine.

For the literary character of the work, however, he begs the indulgence of the profession, as it has been written during the intervals of leisure that occur amid the cares and perplexities of a large and increasing practice. The design of the work is to bring forward facts and practical observations that have stood the inexorable test of experience, in a clear and forcible manner, rather than drape them in the tinsel of mere literary display.

In conclusion, indebtedness is acknowledged to the following standard authorities, which have been largely and continually consulted throughout the progress of the work, viz: Smith's Principles and Practice of Surgery; Erichsen's Science and Art of Surgery; Gross's System of Surgery; Miller's Principles of Surgery; Druitt's System of Surgery; Geddings's Lectures on Surgery; Syme's Surgery; Mott's Velpeau; Hill and Hunt's Practice of Surgery; Helmuth's Practice of Surgery; Hemple's Materia Medica; Hale's New Remedies; Teste's Materia Medica; including the published volumes of the North American Journal of Homœopathy, American Homœopathic Review, the Monthly Homœopathic Review (London), British Journal of Homœopathy, United States Journal of Homœopathy; and the following periodicals: Medical Investigator (Chicago), Monthly Homœopathic Observer (Detroit), Western Homœopathic Observer (St. Louis), and others.

To Dr. W. A. PHILLIPS, a former student, and to Dr. T. G. COMSTOCK of St. Louis, for freedom of access to his large and well-selected library, and for many other courtesies generously bestowed by him on various occasions, is the author indebted for valuable assistance during the progress of the work.

To J. R. BUCKINGHAM and GEORGE A. BAUER, of St. Louis, lithographers and engravers, who furnished the wood-cuts, indebtedness is also acknowledged for correctness of design and artistic workmanship.



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GENERAL HISTORY OF SURGERY.

A BRIEF HISTORICAL SKETCH OF SURGERY FROM THE EARLIEST PERIOD TO THE PRESENT TIME.

THE origin of Surgery is coeval with that of Medicine, and dates from the earliest periods of the history of man—the infliction of injuries and the occurrence of accidents rendering it imperative that something should be done to relieve human suffering and remedy deformity. During the Jewish dispensation surgical operations were performed with frequency and safety; and the Jewish law-giver, Moses, makes mention of the operation of circumcision, describing the procedure with minuteness and fidelity—so closely resembling the operation now daily practiced by that sect of Christians.

The embalming of Joseph, spoken of in the sacred writing, also proves that the study of anatomy was practiced in those earlier periods, as without a knowledge of the human structure it would be impossible to open the body for the purposes indicated.

CHIRON, the Centaur, who was supposed to have been born in Thessaly at an early period of the human race, is the first person spoken of in history as the reputed originator of the art of surgery.

Following him, mention is made of *ÆSCULAPIUS*, the son of Apollo, born 1142 B.C., who is supposed to have been a pupil of Chiron; and next in order follows the two sons of *ÆSCULAPIUS*, *MACHAON* and *PODALIRUS*, who, according to the writings of Homer, served in the Trojan war as surgeons of considerable distinction. It is said of Podalirus that he was the first surgeon to abstract blood as a means of combating inflammation, having opened a vein in either arm of the daughter of the King of Caria, and as a recompense for such successful treatment, it is said, he was given her hand in marriage.

The *ASCLEPIADES*, or reputed descendants of *Æsculapius*, are the only surgeons of whom history makes mention for the ensuing

five hundred years; and succeeding these, PYTHAGORAS, who was born 608 B.C., follows in the natural order of time.

A cotemporary of Pythagoras, DAMOCEDES, is also mentioned as having treated King Darius for a sub-luxation of the ankle; also, his wife, Atossa, for mammary cancer.

Next follows HIPPOCRATES, the so-styled father of medicine and surgery, from whom all future surgeons are traced. Hippocrates, born 400 B.C., was the first surgeon of whom history makes mention as occupying a high rank in the chirurgic art. He performed many new and original operations; employed the actual cautery and moxa in overcoming disease; he first taught the use of issues and tents as means of producing counter-irritation; first operated for calculi in the kidney by incision. He also reduced dislocations, adjusted fractures, employed the obstetrical forceps for preternatural labor; used the trepan in depressed fractures of the skull; taught percussion as a means of investigating diseases within the thorax, and performed the operation for empyema or paracentesis thoracis. He was also the author of many valuable papers on the treatment of surgical diseases.

PRAXAGORAS, of Cos, succeeded him in the practice of surgery, and became an accomplished chirurgeon, being the originator of many surgical processes, some of which are employed at the present time. He pointed out the importance of scarifying the tonsils in inflammation of that organ; excised the uvula; operated for artificial anus, and opened the intestine in obstruction of that viscus. He first, it is said, taught the difference between *arterial* and *venous* circulation, and used the pulse as diagnostic of disease.

HEROPHILUS, who lived about 320 B.C., became an accomplished anatomist and surgeon, and was the first in the profession who practiced dissections as a basis of surgical knowledge.

ERASISTRATUS, who lived as a cotemporary of Herophilus, also pursued the study of dissections, and is said to have invented many valuable surgical instruments. He is reported to have reduced a dislocated humerus for Diodorus Cronus, and by this operation to have demonstrated the existence of *motion*, a fact hitherto denied by surgeons.

XENOPHON, who succeeded him in the order of time, was the first to use the tourniquet in arresting hemorrhage, by encircling the limb with a tightened cord.

AMMONIUS is said to have been the first surgeon who performed the operation of lithotripsy, and devised an instrument for crushing stone in the bladder. A number of operations of this character were made by him, with considerable success.

CELSUS, who lived at the beginning of the Christian era, was the first to operate for calculi by external incision. He was the author of a treatise on the removal of cataract by depression; also, of the several species of hernia; operated for hare-lip; described the process of adjusting artificial pupil; improved the operation of trepanning, and also of amputation; and first recommended the application of ligature to wounded arteries. He was a cotemporary of Ovid, Virgil, and Horace, and largely imbibed the literature of that period. It may be proper here to remark that lithotomy, previous to this period, was practiced by *specialists*, surgeons being altogether opposed to the performance of this operation.

ARETÆUS, who practiced during the reign of Nero, A.D. 50, was the author of the application of blisters to diseased organs, and also originated the use of cantharides as a vesicant. He violently opposed the operation of tracheotomy upon the ground of the non-healing of the cartilages.

RUFUS, surnamed the Ephesian, who lived A.D. 100, during the reign of Trajan, the Roman emperor, first ligated the brachial artery for aneurismal varix at the elbow; he also described the peculiar characteristics of the diseases of the bladder and kidneys, and gave a distinctive history of these derangements.

GALEN, CLAUDIUS, about the period A.D. 150, attracted the attention of surgeons to dislocations *backward* of the femur, a luxation hitherto unknown, and described its characteristic symptoms as contradistinguished from other varieties of displacement of this bone. He also wrote a treatise on spontaneous luxations of the femur, and trepanned the sternum for empyema.

ANTYLLUS, who flourished A.D. 340, revived the operation of tracheotomy in threatened suffocation from diseases of the throat; taught the principle of opening arteries in diseases of great danger; and, to prevent hemorrhage, recommended the vessel to be entirely divided crosswise—instead of its division obliquely, as formerly practiced. In aneurism, he ligated the artery both on the cardiac and distal extremities, opening the sac lying between, in order that

it should heal by granulation. He also originated the cure of hydrocele by a free incision.

ÆTIUS, A.D. 470, first proposed scarification in anasarca of the extremities; excised hemorrhoidal tumors; employed lithontriptics to dissolve calculi; wrote treatises on diseases of the testicle, hernia, and advocated castration.

Following him in the succeeding century, ALEXANDER, of Trallis, wrote on fractures and diseases of the eye.

PAULUS ÆGINETA, A.D. 670, used his finger, introduced within the rectum, as a sound to detect the existence of stone; advocated the lateral operation in the removal of calculi. He extirpated the breast for cancer by a crucial incision; operated for strangulated hernia; was the first to perform embryotomy, also to treat fracture of the patella. He advocated the theory that aneurism was caused by rupture of the arterial coats, and first advised copious blood-letting in calculous disorders. It is claimed by some historians that he first performed the operation of tracheotomy, though by others it is denied, the credit being given to the Asclepiadeæ.

CALIPH HAROUN, the Arabian, A.D. 790, had charge of a hospital at Bagdad, and first instructed students in the art of diagnosing and treating diseases at the bedside. His clinics were attended by large numbers of *Christians*, seeking admission into the ranks of the profession; and it is said over six thousand students received instruction in the wards of this hospital.

RIHAZES, A.D. 924, first pointed out the diseases spina ventosa and spina bifida, and described the characteristics of each. He also opposed the operation for cancer hitherto indiscriminately employed, and recommended the operation in those cases only where the tumor was entirely detached from the surrounding textures. He also advised the cauterization of poisoned wounds.

AVICENNA, A.D. 1000, first taught the use of the flexible catheter; was the originator of the metacarpal saw, in operations about the hand, and almost identical with the one lately invented by Hey. He observed the distinction between cataract and closure of the pupil, and recommended appropriate treatment in each disease.

ALBUCASIS, who practiced A.D. 1100, is said to have been the first surgeon who observed the effect of clot in the arteries in arresting hemorrhage. He also invented an instrument for the cure of fistula lachrymalis, as well as a needle for the removal of cataract.

The removal of tumors by ligature ; the description of lithotomy as practiced on the female, and the lateral operation in the male ; and also the operation for hydrocephalus — are attributed to him. Many other operations — such as closing wounds of the intestines by sutures, excision of the uvula and tonsils, removal of polypi — were practiced by him to a considerable extent.

Subsequent to this, the art of surgery for a century or two, especially in Rome, Egypt, and Assyria, seems to have made but little progress. About this period, Popē Innocent II. described the practice as degrading, and forbade the clergy to pursue it.

In England and France, however, it seems to have found some ardent advocates during the two succeeding centuries ; for we find that in Paris, PITARD, who flourished A.D. 1270, established the College of Surgeons, and gave an impetus to the art. In England, too, JOHN OF GADDESSEN and GILBERTUS ANGLICANUS advocated the practice of surgery, and gained great distinction by the performance of many interesting and important operations.

During this period the Cæsarean section was first carefully described and recommended as a procedure to be adopted under certain contingencies.

In the year 1460, GERMAIN COLOT revived, by legal enactment, the operation for stone (which previously had fallen into disuse), being hitherto almost exclusively practiced by non-professionists in medicine.

During the fourteenth century, coeval with the discovery of printing, the progress of surgery became more marked, its influence more widely disseminated, and its position in the social scale more elevated. The origin of syphilis is attributed by some European writers to the expedition of Columbus and the discovery of America, which took place in 1492. It may be proper here to remark that syphilis was known and described by surgeons a long time anterior to this period. Thus, ALBUCASIS, in the eleventh century, makes mention of the disease, and recommends certain remedies for its cure ; also, JOHN OF GADDESSEN, A.D. 1300 ; and VALESCO DE TARANTA, who practiced at Montpellier A.D. 1410, nearly a hundred years before the expedition of Columbus. In face of these declarations, it is obviously unfair to attribute its origin or to connect the first knowledge of the disease to the expedition of Columbus to the hitherto unknown shores of America.

AMBROSE PARE, in the fifteenth century, occupied a very prominent position in the profession, both by his practice and writings. He inaugurated a new period in surgery; wrote on gunshot wounds; first used the twisted suture in hare-lip; and employed ligatures in preference to the actual cautery so much in vogue among his predecessors. He gave an impetus to the art unsurpassed by any surgeon before his time.

During this century, TALIAHOTIUS, an Italian, revived and systematized the different processes of plastic surgery, or "Taliacotian" operations, which previous to this time were performed by non-professionists, or empirics, in a very unsatisfactory and irregular manner.

FABRICIUS, A.D. 1610, the preceptor of the immortal Harvey who discovered the circulation of the blood, invented and employed the trephine, in injuries of the skull; and also introduced to the profession the use of the curved canula, now so extensively used after the operation of tracheotomy.

During this century many brilliant names were added to the profession, among whom were: WISEMAN, of England, who first taught the propriety of *immediate* amputation in military surgery; JAMES YOUNG, also of England, who first proposed the flap operation in amputations of the extremities. FABRICIUS HILDANUS, of Germany, and SCULTETUS, added to the list of surgical armamentaria many new and improved instruments, a number of which are used at the present day.

During the seventeenth century, surgery in the United States made considerable advancement, and numbered among its followers many names of distinction and honor.

M. LEVRETT, a distinguished French accoucheur, in 1743, first made known to the profession the process of examining diseases of the throat by means of instruments which "reflected the luminous rays in the direction of the tumor."

In 1752, the first general hospital in this country was founded at Philadelphia. Its surgical wards were presided over by Drs. PHYSICK, PARRISH, HARTSHORNE, and BARTON, who gave an impetus to the exercise of this art in the United States.

In 1765, the medical department of the University of Pennsylvania was organized at Philadelphia, and was the first incorporated medical school in this country. That of Columbia College, founded

under the name of King's College, in 1768, was the second medical institution organized in the United States. The names of many brilliant practitioners, during this century, have found an honored position in the annals of surgery, by their advancement of the profession and the development of new and valued processes in the chirurgic art. Among these may be mentioned, as occupying the foremost rank, Drs. SHIPPEN, WARREN, PHYSICK, MOTT, NATHAN SMITH, STEVENS, HARTSHORNE, PARRISH, and BARTON.

DESAULT, of France, first taught surgical anatomy, A.D. 1730. He was distinguished not only as a surgeon, but as an instructor and teacher of the chirurgic art. Many improvements in surgery were advocated by him, among which was the substitution of the *straight* amputating knife, for the curved one then in general use. The cure of artificial anus was first proposed by him, by removing the septum between the extremities of the gut; as was also the ligature of the artery on the distal side of an aneurismal tumor.

Dr. BOZZINI, of Frankfort-on-the-Main, in 1807, published a work on the subject of his invention, entitled "The Light-Conductor; or, Description of a Simple Apparatus for the Illumination of the Internal Cavities and Spaces in the Living Animal Body."

Dr. BENJ. GUY BABINGTON, in 1829, invented the laryngoscope, similar to the one now in use, and may with justice be regarded as the author of endoscopic surgery.

HISTORY

OF

SURGERY IN THE UNITED STATES.

MANY European surgeons of distinction, both military and civil, have, since the preceding period, shed lustre upon the profession and exalted its practice to the dignity of a science. Among these may be mentioned the COOPERS, the HUNTERS, LARREY, BELL, LISTON, VELPEAU, ANDRAL, SEDILLOT, and FERGUSON, who have so improved and perfected this art that it forms one of the brightest pages in the history of human progress and human achievement. In the United States, too, as a science and art, it has been exalted and dignified by the genius and skill of American surgeons until it has reached, if not perfection as a science, at least a position coequal with that of the natural sciences. During the present century its progress has been more marked, its position more elevated, its practice more honored, than at any previous time during the world's history; and this, in a great degree, is due to the tireless energy, the boundless ambition, and the consummate skill of its American representatives.

WATERHOUSE, in 1800, was the first physician who vaccinated in the United States, being only one year after its discovery by Jenner.

Dr. PHYSICK, of Philadelphia, in 1802, was the first in the United States who proposed the cure of false joint, by introducing a seton between the fractured extremities of bones. The succeeding year he ligated the brachial artery for aneurism in the bend of the arm.

Dr. MASON F. COGSWELL, of Hartford, Conn., the same year ligated the carotid, for removal of a tumor in the neck.

Dr. JOHN C. WARREN, of Boston, in 1803, ligated the femoral artery for aneurism of the leg.

Dr. McCLELLAN, of Pennsylvania, in 1805, extirpated the parotid gland.

Dr. WALTER BRASHEARS, of Kentucky, in 1806, made the first successful amputation at the hip-joint in the United States.

Dr. SAMUEL WHITE, of New York, in 1808, successfully removed the parotid gland. He also, in the same year, successfully extracted a tea-spoon lodged in the intestines, by cutting into the abdomen and opening the bowel.

Dr. McDOWELL, of Kentucky, in 1809, removed successfully *three* ovarian tumors through the abdominal parietes—the first operation of the kind ever performed. Since then, Dr. McD. has operated on *ten* other cases.

Dr. DORSEY, of Philadelphia, in 1810, first ligated, in the United States, the external iliac.

Dr. DEADERICK, of Tennessee, the same year, resected the entire half of the lower jaw—the first operation of the kind ever performed up to this time.

Dr. WILLIAM GIBSON, of Baltimore, in 1812, ligated the primitive iliac in a patient with a wound in his groin. The same year, Dr. McDOWELL, of Kentucky, lithotomized successfully James K. Polk, subsequently elected President of the United States.

Dr. WRIGHT POST, of New York, in 1813, successfully tied the common carotid artery.

Dr. CHARLES MCCREARY, of Kentucky, in 1813, first in the United States, successfully exsected the entire clavicle, the patient living thirty-five years after the operation, and having good use of the limb.

Dr. BOWEN, of Providence, in 1814, amputated at the shoulder-joint.

Dr. VALENTINE MOTT, of New York, in 1815, first performed the herculean operation of ligating successfully the arteria innominata, the patient living twenty-six days thereafter.

Dr. HUBBARD, of Connecticut, in 1815, ligated successfully the axillary artery.

Dr. WRIGHT POST, of New York, in 1817, tied the subclavian artery, *without* the scaleni muscles, being the first successful operation of this vessel ever performed in the United States.

Dr. GLOVER, of Charleston, in 1818, first, in this country, tapped the head in a case of hydrocephalus.

Dr. JOHN C. WARREN, of Boston, in 1820, first in America, performed the operation successfully for staphyloraphy.

Dr. MOTT, in 1821, removed half of the lower jaw, being the second operation of the kind performed in the United States, but the *first* one published.

Dr. GEORGE McCLELLAN, of Philadelphia, in 1823, resected the anterior portion of the lower jaw from its angles, for an osteosarcoma of the bone.

Dr. A. H. STEVENS, of New York, during the same year, resected successfully nearly the entire upper jaw.

Dr. DAVID L. ROGERS, of New York, in 1824, also extirpated almost the entire upper jaw.

Dr. GEORGE McCLELLAN, of Philadelphia, in 1825, ligated the carotid artery *three* times successfully. In the same year he removed the parotid gland.

Dr. BUTT, of Virginia, in 1825, resected successfully the *entire* radius.

Dr. RHEA BARTON, of Philadelphia, in 1826, resected the head of the femur for ankylosis, and established a false joint, which the patient used advantageously.

Dr. MOTT, in 1828, extirpated the entire clavicle successfully. The same year, he tied the primitive iliac artery, the patient doing well.

Dr. JOHN C. WARREN, of Boston, in 1828, resected half of the lower jaw.

Dr. MOTT, the same year, for the *second* time, removed the entire clavicle successfully.

Dr. J. KEARNEY ROGERS, of New York, in 1829; resected a portion of the femur, thereby remedying the deformity attendant upon an ankylosed hip.

Dr. MOTT, in 1829, operated successfully upon an ankylosed jaw, by dilating and incising the soft tissues.

Dr. GILLESPIE, of Virginia, in the same year, removed successfully the astragalus in compound dislocation of the ankle-joint.

Dr. DEPEYRE, of New York, in 1831, first in the United States, performed the operation of lithotripsy.

Dr. MOTT, in 1833, tied the right subclavian artery within the

scaleni muscles. The same year, Dr. HALL, of Baltimore, ligated the arteria innominata, unsuccessfully.

Dr. THOMAS HARRIS, in 1834, resected the elbow-joint.

Dr. BARTON, in 1835, resected the femur for ankylosis of the knee-joint, and successfully straightened the extremity, so that the patient could use the limb.

Dr. J. MASON WARREN, of Boston, in 1837, first performed successfully, in the United States, the "Taliacotian" operation for restoration of the nose.

Dr. MUSSEY, of Cincinnati, in the same year, resected the entire scapula and clavicle.

Dr. GEORGE MCCLELLAN, in 1838, removed the entire upper extremity, including the scapula and clavicle.

Dr. GURDON BUCK, Jr., of New York, in 1841, resected the elbow-joint for disease of that articulation.

Dr. JOHN WATSON, of New York, in 1844, performed the operation of œsophagotomy, successfully.

Dr. BUCK, of New York, in 1845, excised a wedge-shape portion of the knee-joint in ankylosis; embracing the patella, condyles, and articulation of the tibia.

Dr. J. KEARNEY RODGERS, of New York, in 1845, tied the sub-clavian of the left side within the scaleni muscles.

In 1846, the inhalation of ether as an anæsthetic agent was discovered by Dr. MORTON, of Boston, and first brought into use by Dr. J. C. Warren, of that city.

Dr. SWEAT, of Maine, in 1847, made a successful amputation at the hip-joint.

Dr. WILLIAM E. HORNER, of Philadelphia, in 1850, resected the entire half of the upper jaw without employing any external incisions in the cheek.

Dr. PAUL F. EVE, of Georgia, in the same year, extirpated successfully the entire uterus.

Dr. GILBERT, of Philadelphia, in 1851, suggested a new and valuable mode of counter-extension in fractures of the femur, by the application of strips of adhesive plaster to the limb.

Dr. CARNOCHAN, of New York, in 1851, removed successfully the entire lower jaw, disarticulating it at the condyles.

Dr. PEASLEE, of New York, in the same year, removed both ovaries successfully, by the large peritoneal section.

Dr. J. MARION SIMS, of Alabama, in 1852, invented a new process—the “clamp suture”—for the cure of vesico-vaginal fistula.

Dr. STEVEN, of Ontario, New York, in 1854, successfully disarticulated the head of the femur, and excised it at the line of the surgical neck.

Dr. OWEN, of Charleston, S. C., in 1856, performed the operation of Cæsarean section, having done it twice before in the same patient.

Dr. E. S. COOPER, of San Francisco, in 1859, tied the arteria innominata for aneurism of the right carotid and subclavian arteries.

Dr. E. S. FENNER, P.A.C.S., U. S. Vols., in 1862, amputated successfully at the hip-joint, the operation having been performed twenty-four hours after the injury.

Dr. R. B. BONTECOU, Surgeon U. S. Vols., in 1862, successfully excised the entire knee-joint two days after the injury was received. An H-shaped incision was employed.

Dr. E. C. FRANKLIN, of St. Louis, Surgeon U. S. Vols., in 1862, excised the sternal two-thirds of the clavicle, for gunshot wound, the patient dying of hospital erysipelas sixteen days afterward.

Dr. EDWARD SHIPPEN, Surgeon U. S. Vols., in 1863, also amputated successfully at the hip-joint. The operation was performed seven hours after the injury was inflicted.

Dr. JOSHUA THORNE, Act. Asst. Surgeon U. S. A., in 1863, successfully excised the outer condyle of the femur, with part of the shaft. In this case the report says no anæsthetic was used, and the operation was performed nearly five months after injury.

Dr. JAMES H. ARMSBY, of Albany, in 1863, tied the subclavian artery successfully above the clavicle, the patient making a good recovery.

Dr. JOHN HEMANS, Jr., Asst. Surgeon U. S. A., in 1863, resected three inches of the upper third of the femur for necrosis of the bone, following a gunshot wound, with the most beneficial results.

Dr. WILLARD PARKER, of New York, in 1863, ligated the subclavian inside the scalenus muscle, together with common carotid and vertebral arteries, for aneurism. Death occurred from secondary hemorrhage on the forty-second day after operation.

Dr. ALEXANDER B. MOTT, Surgeon U. S. Vols., in 1864, per-

formed a successful secondary disarticulation at the hip-joint, in consequence of necrosis of that bone. The same year Asst. Surgeon C. WAGNER, U. S. A., performed a successful secondary operation at the hip-joint.

Dr. A. W. SMITH, of New Orleans, in 1864, ligated successfully the arteria innominata; also, the right carotid for aneurism, which is one of the greatest surgical achievements of the age. Of this operation, Mott, the great American surgeon, said: "I have expressed myself to my class for many years past that I would like to live long enough to see the innominata successfully tied for aneurism. For this surgical achievement I am more than gratified—I am delighted. On the brow of Dr. A. W. SMITH, of New Orleans, will always rest the laurel of the first successful operation of ligature of this great artery. Time can never rob him of this surgical achievement."

Dr. J. H. PACKARD, Act. Asst. Surgeon U. S. A., in 1865, reamputated at the hip-joint successfully, seventeen months after the first operation. The disease for which the disarticulation was performed was necrosis of the femur.

The introduction of the endoscope for the examination of the urethra, and treatment of diseases of this canal and the surrounding organs, is also another late introduction into the surgical armamentarium.

Among the surgical performances of the past two years are the following:

Dr. H. A. POTTER, of Geneva, New York, in 1865, successfully removed a large molar tooth from the under surface of the tongue, the offending material having remained unknown for some time, giving rise to severe and protracted hemorrhage.

Dr. HORATIO ROBINSON STORER, in 1865, successfully removed the uterus and both ovaries by abdominal section, the tumor weighing altogether thirty-seven pounds.

Dr. GURDON BUCK, of New York, in 1865, made a very ingenious and successful operation for a hideous deformity occasioned by a complicated double hare-lip and cleft palate.

Dr. NATHAN BOZEMAN, in 1865, reports a very interesting and instructive case of ovariectomy, in which the intra-peritoneal treatment of the pedicle with the silver ligature, was adopted with most brilliant success.

Dr. W. T. HELMUTH, of St. Louis, in 1865, successfully removed the entire half of the inferior maxillary bone. In the same year, he resected the tibia and fibula in the case of a boy whose foot was bent nearly at right angles with his body, resulting from fracture of these bones. In the following year, he removed successfully a calculus from the bladder of a boy seven years of age, who was afflicted with the complaint from infancy.

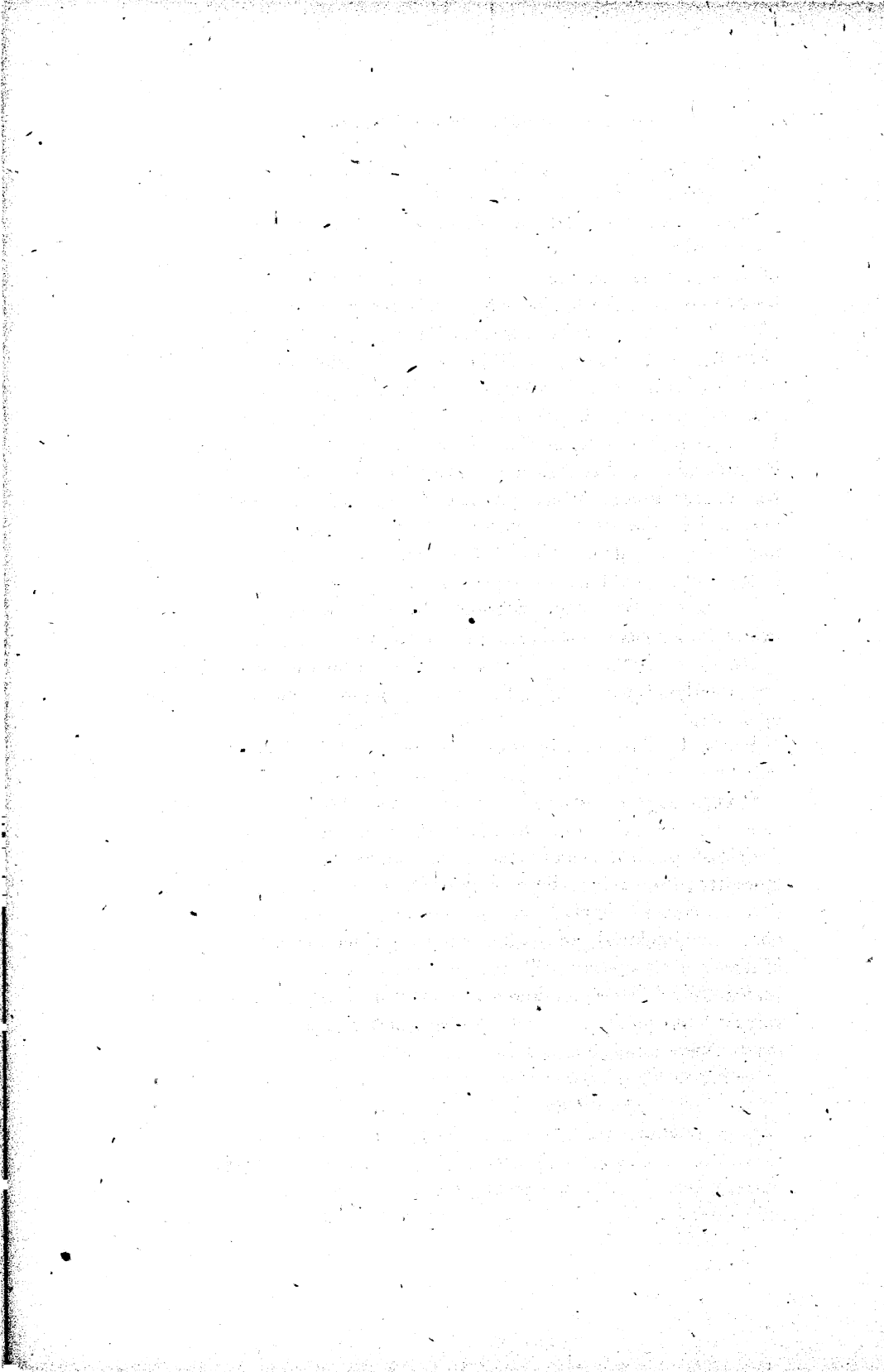
In the past two years, 1865 and 1866, the attention of the profession has been directed from various sources to anæsthesia, and the agents which produce the best vapors for these purposes. Local anæsthesia especially, by a variety of spray-producing instruments, has been such a signal success, and its application has so far exceeded the promise of what it was expected to accomplish, that it is impossible to predict what future results may be anticipated. These topics will, however, be alluded to in the chapter on Local Anæsthesia.

Dr. JOSEPH CREAMER, in 1866, also removed successfully both ovaries, the patient making good her recovery.

Dr. C. A. POPE, of St. Louis, in 1866, removed the uterus and both ovaries, the patient dying soon after from the shock of the operation.

Dr. D. O. FARRAND, in 1866, ligated the subclavian artery, the patient succumbing a few days after the operation.

I regret that many surgical operations of interest to the profession are necessarily excluded from their places in this historical sketch of surgical achievements; but, amid the great number of operative proceedings, those only which occupy a prominent position *on record* have been appropriated by the author as the distinctive landmarks of medical progress since the earliest periods of the world's history. To my Homœopathic confreres who have been solicited for operations of interest and practical details of value to the profession, and who have not responded to such call, the omission must be credited.



PART I.

GENERAL SURGICAL PATHOLOGY AND THERAPEUTICS.

IN order to arrive at a proper understanding of the work before us, and for the advantages of systematic study, I shall furnish, under the title of Surgical Pathology and Therapeutics, those general considerations that pertain to the investigation of the character and results of surgical disorders, and also the remedies that enter into their treatment. The results or pathological lesions that are intimately associated with such disorders, will be considered under the head of *Surgical Pathology*, while the characteristics of disease, as well as the adaptability of means for its cure, will be treated under the head of *Surgical Therapeutics*.

CHAPTER I.

MODIFICATIONS OF HEALTHY NUTRITION.

Surgical Pathology, a branch of **General Pathology**, teaches the investigation of those derangements or abnormal conditions that pertain more exclusively to the practice of the surgeon than the physician. All diseases considered as deviations from a healthy standard "may be studied either as exhibited in the disordered action noted in special tissues, or in that seen under very much the same general characteristics wherever developed; hence, they are divided for systematic reference into *special* and *general disorders*." The proper understanding of the great principles

that enter into the consideration of general derangements will facilitate the student in the appreciation of those modifications and differential changes that are met with in diseased action in special localities.

There is no part of this treatise more valuable to him who would become a proficient in the art, than a thorough knowledge of the cardinal principles of Surgery, as comprised under the head of inflammation, wounds, new growths, morbid deposits, and poisons. After a thorough acquaintance with these great landmarks in the domain of surgical knowledge, it is easy for the student to master the issues of minor yet weighty importance that proceed from or are identified with them. If principles are well and rightly instilled in his mind, he will readily form a proper appreciation of what is merely operative.

Health being considered as a normal condition of each component part of the organism, which is "maintained and developed by a series of acts designated as **Nutrition**," a brief reference to the views of physiologists on this process will tend to the elucidation of points in *disease*, or that condition resulting in, or from, a modified nutritive action."

SECTION I.

OUTLINES OF THE NORMAL NUTRITIVE PROCESS.

Nutrition is defined by physiologists "as that modification of the formative process peculiar to living bodies, by which the tissues and organs already formed maintain their integrity." All tissues and organs in the body are shown by microscopic investigation to consist of a series of minute elementary atoms called *cells*, the vital functions of which, or, as it is termed, *cell action*, afford nutrition to every part of the organism.

To accomplish, therefore, the process of nutrition, *three* phenomena are required: *first*, a normal cell action; *second*, a proper condition and supply of blood; *third*, a proper nervous or life force to regulate all. Any deviation from this state is productive of diminished or excessive reaction.

The demand for nutrition arises primarily from the tendency of the organism to simply *increase* or *growth*. The multiplication

of the first embryonic cell is illustrative of this process, by what is termed "duplicative subdivision," by which a multitude of cells are formed, each one being in all essential particulars similar to the original. It is by this process that the embryo becomes the child, the child the adult, with comparatively little change save that of growth. These changes are divided by physiologists into *four* well-marked ages or periods:

1st. **Development.** 2d. **Growth.** 3d. **Adult Life.** 4th. **Old Age.**

Development begins primarily in *intra-uterine* existence, and is the increase or passage of the germ to a higher condition of form and structure. In this change which takes place, the part becomes fitted for some special function, and is advanced towards the state in which it exists in the highest or most complete form of its specific type.

Growth consists in the achievement of *size*, and is most marked between the period of birth and puberty. The difference between the processes of development and growth, is most marked in those cases in which there is a partial or complete arrest of one, without a corresponding impairment of the other. Thus, a dwarf, however small in stature, may present a perfect development of every part that is characteristic of the complete human organism, the deficiency being solely in the capacity for *growth*. On the other hand, the ordinary size at birth may be attained, every organ presenting its usual dimensions, and yet some important part may be found in a state of *arrested development*. This is apparent in those abnormal conditions of the heart and brain that are sometimes witnessed in extra-uterine life. An *excess* of growth, taking place conformably to the normal place of the tissue or organ, constitutes *hypertrophy*; a *diminution* of growth, without degeneration or alteration of structure, is known as *atrophy*.

Adult Life is essentially the period in which nutrition plays the most important part. During the time of active life, a demand for nutrition is created by every exertion of the vital powers, but more especially by the evolution of the nervous and muscular forces. The production and application of these two forces may truly be considered the great end and aim of the human organism, so far as the individual is concerned. At this period the forces of the organism are diligent in preserving the development already attained, and repairing the waste continually going on. This is

effected through the process of assimilation, manifested from the beginning of existence up to the period of death of the organism.

Old Age is the period characterized by impairment of nutrition, with a progressive tendency to wasting and decay. Evolution takes the place of involution. In advanced age, from insufficient nervo-muscular energy, nutrition is performed less rapidly, and waste is the result. Thus, then, with the advance of old age, the organism becomes progressively more and more unfit for the active performance of its vital operations; a gradual weakening is observable in the mental as well as in the corporeal energy. Degenerations of the tissues and organs of the body proceed as age advances; and the entire system, unable to perform its accustomed functions, gradually sinks into death—the end of life.

The performance of the function of nutrition is dependent not merely upon a due supply of pure and well-elaborated blood, but also upon the normal condition of the part to be nourished, and especially upon its possession of a right measure of “formative capacity,” in virtue of which the newly-produced tissues are generated in the likeness as well as in the place of those which have become effete. The exactness of this replacement is most remarkably shown in the retention of the characteristic form and structure of each separate organ or part of the body, and thus of the entire organism through a long series of years; no changes being apparent (so long as the state of health is preserved) but such as are conformable to the general type of that alteration which the organism undergoes with the advance of life. This is observed not only in the conservation of those peculiarities that make the species, but is also seen in the continuous renewal of those minor characteristics which serve to distinguish man from his fellows. Not only is this formative power exercised in maintaining the original type, but also in keeping up certain acquired peculiarities, as, for instance, the cicatrix left after the healing of a wound. In the preservation of life, whether of a tissue or the whole organism, nutrition consists in the performance of two distinct offices—in one, material is furnished for the formation of new cells, whose destiny is to replace those whose existence has terminated; in the other, the waste constantly going on is supplied in those textures in which the organic forms are permanent. This process is carried on by the function of *assimilation*

and *digestion*, the new material being furnished to the blood, and by it supplied to every tissue and organ. Thus, nutrition consists in a process essentially formative on one hand and destructive on the other. When these processes are evenly balanced, health is maintained and the normal condition of the organism preserved. During the period of *growth* the formative process is in excess, and development is produced. In old age the reverse takes place, and progressive decay ensues. When the disproportion between the formative and destructive process results in abnormal growth, *hypertrophy* is said to occur. When a similar excess of the destructive over the formative processes takes place, *atrophy* ensues. These two processes will be further considered in a subsequent part of the work, under their respective heads, to which the reader is referred.

CHAPTER II.*

SURGICAL SEMEIOLOGY.

THE correct investigation of the elements of a disorder being essential to a recognition of its presence, the first subject to which attention should be directed is Surgical Semeiology, or that portion of pathology which teaches the signs or symptoms of surgical disorders.

Of these signs some are equally applicable to many complaints, and may be studied together, being rather generic in their character; while others, which are more specific, can be best alluded to under the particular head to which they belong. Presupposing that the practitioner is fully acquainted with the anatomy and physiology of the human organism, I shall consider, *first*, those signs and manifestations of surgical disorders as are exhibited for the most part on the exterior portion of the body; *second*, those symptoms that more strictly belong to derangement of the internal organs.

*Smith's Principles and Practice of Surgery.

SECTION I.

SIGNS MANIFESTED ON THE EXTERIOR OF THE BODY.

Health being considered as the result of the perfect operation of all the normal organs of the body, any deviation from this condition constitutes disease. This abnormal state of the parts will be known by the changes that are developed in the individual, and which are cognizable to the senses of the surgeon. The province of the surgeon, therefore, is to make himself familiar with the general condition of the external condition of the body, as is manifested in the *carriage, posture, shape, color, temperature, and sensibility* of the individual, that he may be the better enabled to discriminate between a healthy and diseased condition.

§ 1.—Of the Carriage or Posture of a Patient.

The carriage of man in the full enjoyment of his physical and mental powers is erect, lithe, and graceful; but when these powers are invaded by disease or accidental injury, they become prostrate, and the individual seeks repose in the recumbent, supine, or sitting posture.

The character of the injury will often become manifest by the position occupied by the sufferer.

The *supine position*, in which all the limbs are relaxed, generally indicates, if the result of external violence, great muscular debility or serious depression of the nervous system—all parts of the body being dependent on this great center for life force. The doubling of the body *forward*, or that position in which the limbs are drawn up toward the chest, usually shows abdominal trouble; while its rigidity backward, or extreme extension, the head and heels approximating each other, shows a derangement in the contents of the spinal canal.

The *sitting posture* may be either the result of partial external injury, by which the individual is prevented from assuming the erect position, or it may follow an effort to leave the recumbent attitude, the strength not being sufficient to stand upright.

The *relaxed condition of the extremities*, or their *fixedness in unnatural positions*, is often diagnostic of injuries by which

muscular action is more or less impaired. The power of moving a limb or any portion of the body, freely and at will, denotes health; but a trembling, unsteady, quivering motion, imperfect elevation, or unnatural flexion or extension, denotes an impairment of the muscular powers, or nerve force. In health the mechanical movements of the body and limbs are easy and graceful, while in the injured or diseased condition it is quite the reverse. In the examination of a patient, therefore, the surgeon should compel him to go through a regular set of motions, that he may be enabled to diagnose with accuracy the portion of the body disordered. In conducting an examination of this character, the body should be divested of all extraneous covering, and the manipulation be made with special reference to the part diseased or injured. In the examination of recruits for the army, the surgeon directs the individual to be entirely divested of clothing, and stand erect before him. Inspection is then made of his general carriage, the position of the head upon his shoulders, the fullness of his chest and abdomen, the position of his legs and feet, as well as the general characteristics of his whole external organism. After this, a more minute inspection will be made of separate organs and particular parts. The various movements of the arms upon the body, as well as flexion of the spine backward and sideward, the extension and flexion of the hands and feet, and finally of the fingers and toes, are necessary often to detect disease or injuries from accident.

§ 2.—Of Physiognomy.

The inspection of the countenance or physiognomy, so often relied upon in determining the moral attributes of an individual, is also depended upon, more or less, in forming an estimate of physical disorder. Thus, a lively countenance betokens not only physical but mental quietude and comfort; while a distorted or distressed expression evinces a condition the reverse of health. The sharp nose, hollow, sunken eyes, knitted brows, tenseness of skin, with the leaden or livid hue of the face, denotes great prostration of the nervous forces, and is indicative of extreme suffocation or the approach of death. A pinched character of the features is often the accompaniment of peritonitis. Spasms of the lips and cheeks, termed "risus sardonicus," frequently precede or accompany tetanus.

Frowning is often indicative of pain in the head or eyes; *distension of the nostrils*, of pain in the chest or impeded respiration; contractions of the angles of the mouth, with compression of the lips, are often the result of vesical or rectal irritation; and involuntary spasms of the mouth or tongue, denote injury of the nerves supplying these parts.

§ 3.—The Shape and Size of a Part.

In cases of injury, especially of the extremities, the *shape* and *volume* of the part are points worthy the consideration of the surgeon. These signs demand a comparison of the different sides of the body—it being primarily understood that the right side is more perfectly developed than the left, in consequence of the greater amount of exercise it undergoes. The *enlargement* of any region may develop the formation of unnatural growths in the deep-seated tissues; or the formation of air, as in emphysema of gangrene, or of wounds about the chest; or the existence of matter, or of unnatural secretions, as seen in elephantiasis, in tumors, suppurations, synovial degenerations, etc. The *diminished size* of a region often indicates atrophy, loss of muscular power, or an unnatural relation of parts, as are sometimes witnessed in injuries of muscles, luxations of joints, depressed fracture of the ribs and skull.

Variation in length indicates changes in the natural relations of the continuity or articulating surfaces of bones, and is of importance in determining fractures or dislocations, especially of the extremities. In determining this change in the length of a limb, two fixed points should be taken, and the measurement made between these. In the upper extremities, these points or landmarks are, the acromion process of the scapula and the condyle of the humerus; in the lower extremities, the anterior superior spinous process of the ilium above, and the internal malleolus of the tibia below. Care should be taken that in the measurement of the lower extremities the pelvis should be placed in a direct line with the spine, neither swayed to one side nor the other. An obliquity of the pelvis to either side will increase the length of that side to which it leans.

The *shape* of parts is frequently of importance in determining the existence of disease. The pyriform shape of hydrocele—the oval, globular or ovoidal appearance of hernial protrusions—the

change produced in joints by effusion or suppuration—the knotted, lobulated shape of cancrroid degenerations—the swelling of the abdomen in ascites—the puffiness and œdema of the lids in ophthalmia, etc., etc., are valuable aids to the surgeon in diagnosing the existence of these affections.

§ 4.—Of Color.

The *color* of the skin on the different parts of the body is indicative of disease. The results of accident, such as bruises, contusions, etc., are known by a lividity of the integument; superficial burns by redness, and the chocolate tint, that accompanies circumscribed or diffused sphacelus. The color of the face is often diagnostic of disorder of the system. Thus, a purple or livid tint of the cheeks denotes derangement in the organs of respiration; a leaden or sallow hue is indicative of carcinomatous disease; pallor of countenance, of excessive loss of blood; and a yellow, jaundiced appearance sometimes accompanies gunshot wounds of large joints. Pallor, also, attends concussion of the brain and depressed fracture of the skull. In forming a diagnosis of sphacelus from color alone, judgment should be exercised to distinguish it from the effusion of blood beneath the skin from a bruise, or the discoloration of the integument from purpura hemorrhagica. The color of the skin is also of service in diagnosing tumors, as the *nævus maternus*, aneurisms by anastomoses, and aneurismal tumors. Wherever an obstruction exists in the circulation of a part through the capillary vessels, changes in the color of the skin lying over them are almost sure to take place.

§ 5.—Of Temperature.

The *temperature* of the whole body, or of a part, is often of value to the surgeon, not so much as a symptom of disease as indicating a change in the local or general circulation. Thus, the burning heat of inflammation is often experienced by patients and felt by surgeons as apparently many degrees above the natural warmth of the body; when in reality, according to the observations of physiologists, it is little, if any, exalted above that of the blood.

Cold, or the absence of heat, is of more value to the surgeon as symptomatic of disordered circulation or prostration of the vital forces, indicating the presence of danger from diminished vitality. It is of great importance, after ligation of the larger vessels, to preserve by artificial means the temperature of a part; and also after severe operations or injuries, in order to prevent more serious consequences.

§ 6.—Of the Excretions and Secretions.

In arriving at a correct diagnosis in certain diseases, it is important that the surgeon should inspect the secretions and excretions of the body, as valuable aids in determining the character of the disorder.

Thus, the *urine*, whether clear, turbid, or high-colored, or mixed with blood or pus, with or without sediment, according to its characteristics, points to disease of the kidney or bladder. The *feces*, too, will oftentimes guide us to a more perfect understanding of a disorder by attention to its peculiarities. Blood mixed with fecal matter may be the result of hemorrhoids, and the same intermingled with pus may denote ulceration; and a contracted, narrow-shaped piece of feces, as if compressed on its sides by an obstacle in passing, may prove the existence of an enlarged prostate, the development of schirrus, or the presence of rectal stricture. The *sputa* and *matter vomited*, according to their color frequently become important guides in determining disorders of the stomach, throat, or lungs. If a wound of the chest is followed by a free expectoration of frothy and bloody mucus, the lung will probably be found to have been injured; while the spitting of blood or of pus, and the vomiting of the contents of the stomach, indicate the state of those organs in many surgical disorders.

A continuance of the normal secretions of the body is indicative of the integrity of organs, in the event of injuries occurring in their immediate vicinity. Thus, a pure mucous expectoration, or the regurgitation of food or drink after injury of the chest or abdomen, or the natural discharge of bile, or of urine after injury of the liver or bladder, is of itself sufficient to establish the fact that these organs have not participated in the injury.

The character of the discharge from wounds, ulcers, fistulæ, etc., is of importance as denoting the pathological condition of the tissues involved. Healthy pus, and the clean, moist edges of an ulcer, show a healthy condition of the part; while dark, sanious, grumous, or offensive matter, with angry-looking edges, denotes the existence of less favorable circumstances.

The characteristics of *pus*, and the differential diagnosis of its various attributes, will be discussed under the chapter on the Consequences of Inflammation, to which the reader is referred.

SECTION II.

EXAMINATION OF THE INTERNAL ORGANS.

After investigating the general features of *external* signs of surgical affections, as important in determining the nature of those disorders that fall under the care of the surgeon, it is equally necessary to investigate the state of the *internal* organs, in order to attain the formation of a correct diagnosis.

The four principal portions of the human economy to which I shall call your attention are, *Circulation*, *Respiration*, *Digestion*, and *Nervous Power*.

§ 1.—The Circulation

The information furnished by a careful inquiry into the state of the circulation in its reference to disease is too well known to require discussion. In hemorrhages, the signs from the state of the general and local circulation are all important. The sudden sinking of the pulse, feeble action of the heart, loss of color in the capillaries, are indicative of loss of the vital fluid. Hemorrhage from the ears, if in a young person, is indicative either of rupture of the membrana tympani, or fracture of the base of the skull, involving the petrous portion of the temporal bone. Hemorrhage from the rectum, in case of severe injury affecting the abdomen, is diagnostic of rupture of some of the vessels within that cavity.

In tumors associated with aneurismal enlargement, the activity of the local circulation is strongly indicative of the disease. A fibrous, fatty or other tumor, when bound down by fascia upon the

course of a large vessel, may prove a source of error, unless close attention is paid to the collateral circumstances. When it is desirable to ascertain whether a pulsating tumor is aneurismal or not, it should be raised from the subjacent parts, and then observed whether the pulsation continues. This practice is especially referable to enlarged glands or tumors in the axilla, groin, or neck. The absence of the peculiar aneurismal thrill, the solidity of the tumor, its gradual development, the enlargement of neighboring glands, the constitution of the patient, the exciting cause, etc., will become important aids in establishing a correct diagnosis. The state of the circulation, as exhibited in the capillary vessels, is of value in determining the character of tumors, such as the fungi and the erectile. Thus, rupture of the skin, followed by repeated hemorrhages, will enable us to distinguish between fungous hæmatodes and cancer; frequent bleedings from mucous cavities, accompanied with swellings or tumors, would lead to the suspicion of polypi or of ulceration. A suddenly-formed tumor in the region of a joint, producing faintness, with discoloration of the skin, and developed after severe muscular exertion, may be diagnostic of either rupture of an artery or subluxation of a joint.

The feeble pulsation of the arteries in the extremities is often associated with either the existence of obstruction in the vessel, or of its ossification. If to this condition be added a change of temperature and color in the part, in an aged subject, it points to the existence of senile gangrene. In examining for the pulsation of an artery at its usual seat, we should always bear in mind the natural malformations that sometimes occur in its course, and not be misled by its non-appearance at its accustomed point, in forming a diagnosis in cases involving disease of those vessels.

§ 2.—Of the Respiration.

The rapid or embarrassed state of the respiration is often an important aid to the surgeon in forming a correct diagnosis. Thus, slow, snoring, or stertorous breathing may denote mischief done to the brain. A change in the tone of the voice, or the characteristic cough, may lead us to suspect the existence of disease in the larynx or trachea, as well as foreign bodies impacted in the trachea or œsophagus. A hacking cough, with efforts to clear the throat,

accompanied with titillation in the part, is evidence of disease in that part. In examining the respiratory organs, auscultation and percussion should be practiced by the surgeon, in order to determine with accuracy the character of the disease invading those organs.

§ 3.—Of Digestion.

The changes produced by surgical diseases as affecting the organs of digestion, arising from whatever source, demand careful investigation in forming a correct opinion of the existence of such disorders. I shall consider this subject under the heads of *Mastication*, *Deglutition*, *Hunger and Thirst*, *Vomiting*, *Hiccough*, and *Defecation*.

Mastication.—This function, when improperly performed, will lead us to suspect either a diseased condition of the teeth or of the muscles moving the jaws. Disease of the teeth may be known by pain while in the act of mastication or in approximating the lower to the upper jaw. A crackling noise in the neighborhood of the ear during the act of chewing indicates disorder in the maxillary articulation; the escape of saliva, enlargement of sublingual or other glands of the mouth; swelling of the tongue may be attributed to cancerous affection, ranula, or other diseases affecting that organ.

Deglutition.—Deglutition is an act that, independent of disease, is performed without difficulty or embarrassment; but let the tonsils be inflamed and swollen, the uvula elongated and enlarged, or the pharyngeal or œsophageal orifice be at all inflamed or constricted, and it now becomes difficult, painful, and sometimes impossible. In hare-lip, or fissure of the hard or soft palate, food introduced into the mouth is oftentimes swallowed with difficulty, having a tendency to pass in greater or less quantities through the cavity of the nostril. In œsophageal stricture, or the formation of tumors or abscesses at or near that orifice, swallowing is often difficult, and spasms occasionally take place, most serious in their import, from the accidental course of a particle of food into the larynx.

Hunger and Thirst.—Hunger and thirst, in the healthy state, are removed by the introduction of food and drink into the stomach; but if injury or disease oppose the introduction of these articles

in the system, then insatiate hunger and thirst are the result. A recurrence of either of these, within a short time after a proper amount has been taken, may lead to a suspicion that the food has escaped at some point before entering fully into the system; hence, wounds of the throat, stomach, artificial anus, are almost always followed by constant hunger.

Vomiting.—As a symptom of surgical diseases, vomiting is often of value in determining the character and extent of injuries. Blows on the head, falls, etc.—especially in children—are apt to be followed by vomiting, showing disorder of the cerebral functions. If to the vomiting there be added a tendency to sleep, stertorous breathing, etc., concussion of the brain is likely to have occurred, which demands of the surgeon his most careful attention. After partaking of a hearty meal blows upon the head are prone to produce vomiting, with removal only of the contents of the stomach, no serious consequences ensuing.

The character of the matters vomited is also diagnostic of the disorder or injury inflicted. Vomiting of blood may follow an attack of epistaxis—the blood having been swallowed, coagulates in the stomach and is ejected therefrom; but when it arises from an injury or wound inflicted upon the stomach or throat, producing laceration or division of the vessels supplying these organs, it becomes a matter of more serious import. The vomiting that takes place during an attack of strangulated hernia is of a stercoraceous character, and is prognostic of the most fearful consequences. In intussusception, stricture of the bowels, etc., vomiting is an important symptom. The matters ejected are also stercoraceous—more or less mixed with the contents of the stomach.

Hiccough.—Hiccough may be the result either of a wound of the diaphragm, irritation of the phrenic nerve by its compression from a tumor or other abnormal growth; or it may be the consequence of extreme nervous or vascular prostration, or of long-continued vomiting. The noise arising from the act of hiccoughing is produced by the sudden and involuntary contraction of the diaphragm and the simultaneous closure of the glottis, which arrests the passage of air in the trachea. It is sometimes a *symptom* of gangrene, and occurs as such in many morbid conditions; but it is frequently met with in persons otherwise in good health.

Defecation.—The character of the defecations in many instances is indicative of the actual condition of the intestines. Hardened lumps, or “scybalæ,” indicate constipation; while the mixture of pus or blood may lead to the suspicion of an abscess opening into the bowels; to the existence of fistulæ, hemorrhoids, or to the development of cancer. In the natural condition of the rectum, and in a healthy state of the excretion, the feces are usually round, of moderate size, and of the consistence of potters’ clay while being worked. In stricture of the rectum, in an enlarged prostate gland, or in old and thickened hemorrhoidal tumors, the stool will be found flattened and smaller than in the natural state. In choleric discharges, microscopical and chemical investigations have shown that the evacuations are indicative of certain changes having taken place in the intestines; the rice-like dejections consisting of patches of epithelium removed from the mucous surface of the intestines.

§ 4.—Of Nervous Function.

The evidences furnished to the surgeon by the nervous system in cases of injury are of great value in determining the character of disorders. The existence or absence of pain, the loss or exaltation of muscular power, are more or less indicative of injury to the nervous system.

In some patients there exists an abnormal sensibility to the action of disease or injury, accompanied with nausea, faintness, and great excitability of the nervous powers generally; while in others this sensibility is so diminished or blunted that the most violent diseases or injuries manifest little or no excitement or derangement of this function. It is on this account that the surgeon should be extremely guarded in forming a prognosis as to the result in such cases—remembering always that in some persons a trifling accident develops great prostration; while in others, the most severe lesions are accompanied with a trifling derangement of the nervous power.

As a general rule, however, loss of sensibility, muscular power, or the extreme development of either, should be regarded as indicative of cerebral or spinal disorder.

SECTION III.

USE OF THE SENSES IN FORMING A DIAGNOSIS.

The impressions produced on the mind of the surgeon, in employing the use of the senses in forming a diagnosis of disease, are apparent to all. To observe critically and understandingly, it is necessary that a methodical use be made of the senses, calling into requisition, *first*, those of the most importance in discriminating diseases, and so on, according to their actual value. In this category I shall place first *Sight*, then *Touch*, *Hearing*, *Taste*, and *Smell*.

§ 1.—Of the Sight.

If properly cultivated and applied, sight is the most important and accurate of all the senses as a means of diagnosing disease, especially when applied to the external structures of the body. To be of value, then, the surgeon must become familiar with the appearance of healthy structure, before he can rely upon the impressions made by disease. By the sense of sight, a comparison should be made between the unnatural appearance of a part and that which is presented in a state of health, before any value can be assigned to its importance as a means of diagnosis. Thus, in fracture of a limb; in deformities from dislocation; in swellings caused by tumors and suppurations; and in the contraction of limbs and of the natural orifices, by sight alone we can judge not only of the existence of the deformity, but also of its extent and magnitude. In addition to the change of form, the appearance of parts will give us increased evidence of the character of disease. Thus, *redness* may denote the existence of inflammation; a *copper-colored* spot, the probability of syphilitic taint; a *bluish red* color, the formation of venous rather than arterial vascularity; a *livid* tint, the evidence of ecchymosis; and the *yellow conjunctiva*, the existence of hepatic disorder. By sight we can determine also *change of structure*. The *character* of wounds may be known by their edges; and their *depth* by the color of the blood escaping from them, the presence of muscular tendinous fiber, or by the appearance of nerves in their track. In *ulcers*, we judge of their

acute or chronic character by the appearance of the granulations and the nature of the discharges. In determining the nature of tumors, sight is of importance in demonstrating whether they are malignant or benign, smooth or lobulated, pendulous or pulsate; the variations in condition being subsequently ascertained by the assistance of the other senses. The *microscope*, by the means of sight, has given us much valuable information in determining the character of tumors and other morbid growths, and has become a valuable adjunct to other means in arriving at correct conclusions concerning the nature and treatment of surgical disorders. For a detailed account of the manner of using this instrument, and the uses to which it may be applied, the reader is referred to two excellent monographs* upon this subject. The use of the *laryngoscope* in detecting diseases of the air passages, and of the *auriscope* and *ophthalmoscope* in diagnosing diseases of the ear and eye, are made, by the use of this sense, important adjuncts in the investigation of disease.

§ 2.—Of the Touch.

The sense of touch, either alone or in connection with sight, is of almost limitless importance in its general applicability in the diagnosis of surgical diseases. The pulsation of aneurisms; the mobility of tumors; the crepitation of emphysema, of tendons, and of fractured bones; the movement of liquids, as in fluctuation; the position of the testicle in hydrocele; the sounding for stone in the bladder, are cognizable to the surgeon chiefly through this sense.

The *touch* may be practiced in surgery either through the direct contact of the fingers or of the palms of the hand. The forefinger, on account of its being the most convenient, is more often used, and is the best educated for the purposes of diagnosis. The tactile surface may be augmented by the apposition of the first and second fingers, by which their usefulness is increased in detecting swellings beneath the tissues, whether they are fluid or not. In larger collections of fluid, as in abdominal dropsies, the apposition of the entire palm of one hand on one side of the belly, while the opposite

* "How to Work the Microscope," by Lionel Beale; London. "The Microscope in its Application to Practical Medicine." Same Author.

side is lightly tapped with the pulps of all the fingers of the other, will often indicate the presence of liquid by the sensation, or succussion of the fluid against the palm. In practicing "the touch" great expertness is required, to attain which, frequent and repeated manipulation must be resorted to by the surgeon. In order to possess dexterity and skill in this manipulation, he should proceed as follows: "Retain the fingers of one hand with sufficient firmness on one side of the part to be examined, while with the other he presses quickly and with moderate force on the opposite side of the swelling; or, if the part to be examined is of considerable extent—as the abdomen—let him direct an assistant, as advised by Recamier, to press gently with one hand in the median line of the body, while he manipulates with his own hands as just stated. The motion of the intestines, as well as of the liquid wave, being thus partially checked, the sense of fluctuation, if yet apparent, will be almost certain evidence of the presence of liquid."

By touch, we can determine the existence of congestion in the superficial vessels, or of the activity of the capillary circulation, by alternately pressing upon and quickly removing the finger from the part. If, upon rapid pressure of the finger, and its equally prompt removal, the part quickly regains its livid or florid color, it indicates activity of the circulation; if it is slow and tardy in regaining its original appearance, the circulation is correspondingly weak and torpid.

The peculiar sensation of grating or "crepitation," felt by the friction of two broken fragments of bone upon each other, or the rubbing of two articulating surfaces of a joint together, or by that of a tendon in a thickened bursa, is manifest to the surgeon by the sensation of touch and hearing. Frequent errors in diagnosis, committed by some of the ablest surgeons, will attest the great importance of educating the fingers as diagnosticians in many surgical disorders, whose nature can hardly be correctly understood without the light afforded by the sense of touch.

§ 3.—Of the Hearing.

By this sense the surgeon is frequently enabled to judge of changes in the organism by the intonation and variations of the patient's voice. Thus, in polypus of the nose the natural tone of

voice is altered; and so with diseases of the larynx and trachea, fissures of the hard and soft palate, etc.

By the grating sound, denominated "crepitus," he is enabled to ascertain the nature of disorders as they affect certain structures; as, in the result of mortification, when gas collects in the cellular tissue, a certain crackling sound is heard as well as felt; and so, in the *gurgling* sound that is often heard in circumscribed cavities, as in hernia; and, also, the peculiar whistling sound that, during operations near large vessels, is heard when air enters a vein. In wounds of the thorax, the escape of air from, or the entrance of air into the cavity of the chest, are diagnostic of the character of the injury affecting those organs.

The peculiar *thrill* in varicose aneurisms, caused by the flow of blood through the vessels, is indicative of the connection of a vein with an artery. The elastic "ripe-watermelon-like sound," produced by pressing upon encephaloid growths when they are connected with bone, and the *crackling* of the osseous shells of certain bony tumors, are all made apparent to the surgeon through the sense of hearing.

Percussion and auscultation, in ascertaining the true condition of the lungs in a state of disease; in determining the viability of the foetus prior to operative interference; in ascertaining the extent of effusions into the chest, in reference to the operation of paracentesis thoracis; are a few of the many instances where hearing is made an important adjuvant to a correct diagnosis. The recent application of the *sounding-board* to the vesical sound, to ascertain the presence of a stone in the bladder, is another triumph of art in employing the sense of hearing to the detection of disease within the cavities of the body.

§ 4.—Taste and Smell,

Used by the older surgeons in determining change of structure and in assisting the diagnosis of diseases, are now rarely employed. By the aid of chemistry and the microscope, and the brilliant discoveries made through these channels, the two latter senses are rarely brought into requisition, and are, therefore, of little benefit to the profession in the investigation of surgical disorders.

PART II.

BANDAGING, AND OTHER POINTS OF MINOR SURGERY.

Operative Surgery, as understood in common language, is divided into two great parts — *Minor* or *Auxiliary Surgery*, and *Great Surgery*. This distinction has for a long time existed in practice, though in reality there are no logical considerations that warrant such a division. There are no natural limits that can be established between minor and great surgery. Guy de Chauliac's Work on Great Surgery, the first to take such a title, says nothing of minor surgery; and the Bertheonee, or small surgery of Paracelsus, has no resemblance to the minor surgery of to-day. Minor surgery, at the present, has reference to the mechanical part of those simple processes that are not only connected with operative surgery, but pertain to almost every day's experience in the practice of the profession.

A thorough knowledge of the operations of minor surgery is absolutely indispensable to the complete success of the surgeon. The ability to bandage neatly, and to perform skillfully the various minor operations to which he is ordinarily called, can never be secured by reflection or by a close application to books; but requires, instead, the experience of repeated practice. And through neglect to qualify himself properly in this most important branch, many a practitioner has placed his reputation and prospect of future success beyond the possibility of recovery, or has at least suffered severely from the criticism of those with whom he has been brought in contact.

For convenience and a systematic study of this subject, I propose to devote this part of the volume to the consideration—

1. *Of Apparatus of Dressing.*
2. *Elementary Operations.*
3. *Disinfecting Agents.*
4. *Catheterism.*
5. *Injections.*
6. *Vaccination.*
7. *Removal of Foreign Bodies.*

CHAPTER I.

APPARATUS OF DRESSING.

The art of **Dressing** comprises every methodical application of mechanical and topical means whose object is the cure of surgical diseases. They are the smaller but important operations that the student or practitioner is obliged to call into daily requisition; and may be rightfully considered as perhaps the most useful in surgery.

Dressings are the different articles employed for the relief of injured parts, and to preserve them in proper coaptation, thus facilitating their union. They are also used to prevent a too hasty union; to protect the wound from the action of the atmosphere and external injury; to absorb discharges; to prevent desiccation of surface; and to insure cleanliness.

SECTION I.

INSTRUMENTS REQUIRED FOR DRESSING.

The **Apparatus of Dressing** includes the Instruments for Dressing, and the Pieces of Dressing to be applied.

The *instruments* which the daily avocations of the surgeon call for are of various kinds. For convenience they are arranged in what is known as a Pocket Case, which should contain Forceps; Scissors, straight and curved; Probes; Directors; Spatulæ; Bistouries; Scalpels; Lancets; Catheters; a Porte-caustic; a Tenaculum; Needles, straight and curved; Ligatures; and a Razor.

The **Forceps** supplied are usually of two kinds: the **Polypus** or **Dressing Forceps**, Fig. 1, and the **Artery Forceps**, Fig. 2; the former are employed for removing dressings, in order to protect the fingers from irritating discharges, and also to enable the surgeon to seize them with less risk of injury to the affected part. In using them, the thumb and second finger should be passed through the rings of the handle, and the forefinger extended upon the joint of the blades, which renders them firm.

The **Artery Forceps** are like the *Simple* or *Dissecting Forceps*, with the exception of having a *slide* to keep them shut when necessary; each blade has also longitudinal grooves at the inner side of its extremity, that a firm hold may be obtained.

Fig. 1.

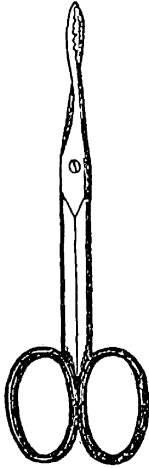


Fig. 2.

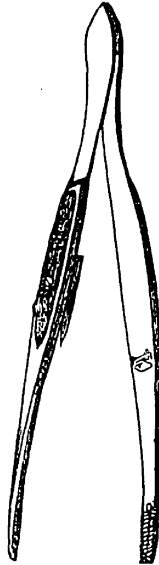
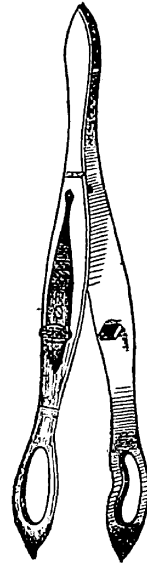


Fig. 3.



Scissors are of two kinds—**Straight** and **Curved**. The use of the former is so apparent that no description is required. The best form of the **Curved** is obtained by their being bent at the joint. They are mainly required to effect the removal of such dressings as adhere closely to the body—such as adhesive strips, bandages, etc.

Probes are intended as substitutes for the fingers; but in all cases where it is possible to introduce the finger, it should be preferred, especially in gunshot wounds, on account of the greater accuracy of the touch. They should be flexible, and made of silver, to prevent their liability to be injured by contact with the various fluids which they may meet. They should, also, be of different sizes; and one should be made with an eye in its flattened extremity, for the purpose of being armed, if necessary, with a ligature of silk or a piece of tape.

The **Director** is simply a broad probe with a groove in it, which is used to direct the scalpel or bistoury in the severing of deep-

seated parts. When employed, it should be held with the thumb on the top of the handle, and the fingers beneath its shaft, to prevent its slipping. The knife, being held in the other hand, is then made to pass along the groove as far as desired.

The **Spatula** is used in spreading cerates, in the preparation of dressings, or for removing substances which remain adherent to the skin, and for depressing the tongue.

Bistouries and **Scalpels** are of various shapes and sizes. The **Scalpel** is simply a knife with a convex cutting edge, whereas a **Bistoury** is either straight or curved. The latter are usually four in number, two **Curved** and two **Straight**, Figs. 4, 5, 6, 7—one of each pair being sharp-pointed, and the other ending in a probe, or button-point. The size of either instrument used will depend much upon the fancy of the surgeon and the character of the operation to be performed.

Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.

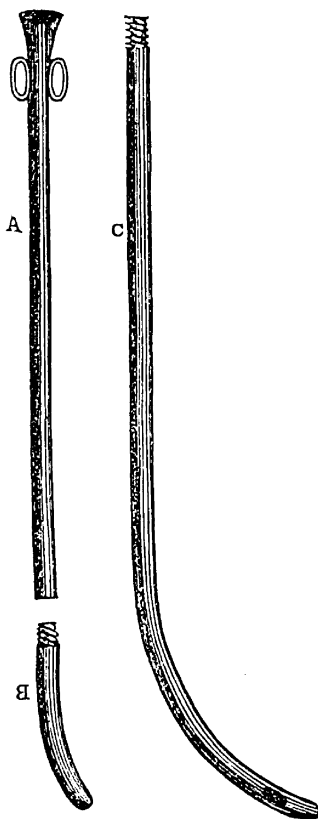


Thumb and Abscess Lancets are so simple, and their use so manifest, no description is accounted necessary.

Catheters are made of either gum-elastic or silver, the latter being preferable. They consist of tubes of various sizes, and are

curved more or less, near their rounded extremities. They are of two kinds, one being adapted to the urethra of the male, the other kind to that of the female. The two are, however, sometimes

Fig. 8.



united into what is called a *double catheter*, Fig. 8. It is of silver, and consists of three pieces, as represented in the accompanying cut. A, a straight tube about five inches long, having at its upper extremity two rings opposite each other; at the other end is cut a screw-thread, fitting either of the two tips, B or C; the former short and slightly bent, for the female, the other long and curved, so as to suit the male urethra. Near the lower extremity of each tip is cut two fenestra, communicating with the cavity of the tube.

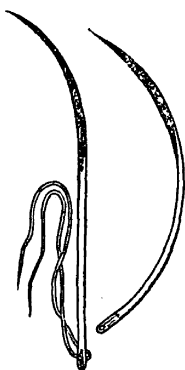
The **Porte-caustic** or **Caustic Holder** has its use indicated by its name. It should be made of platinum, or of silver with platina ends, as this metal best resists the action of the caustics usually employed. When it is required to give the caustic a fine point, it is best accomplished by rubbing it with a wet rag, as the brittleness, especially of nitrate of silver and sulphate of copper, renders it difficult to bring them to a point by scraping them with a knife.

The **Tenaculum** is a hook with a long curve and sharp at the point. It is employed for the purpose of drawing bleeding arteries from the surrounding tissues, by inserting it into their open extremities, that they may be conveniently ligatured. The artery forceps is designed to perform the same office, and in most cases is preferable to the tenaculum.

The **Needles** used by the surgeon are either **Straight** or **Curved**. The latter should be double-edged from the point to the widest part, and very sharp. They should be of sufficient size to make

an opening large enough to prevent any dragging of the skin as the suture is drawn through. The accompanying drawing represents two forms of the surgeon's needle, of which the straightest will usually be found the most convenient.

Fig. 9.

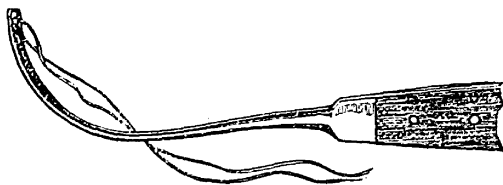


A needle has recently been invented by Prof. Post, of New York, designed to facilitate the introduction of insect pins in wounds of the face and other parts requiring perfect adaptation. It consists of a needle about two and a half inches in length, straight except at the point, where it is slightly curved to the extent of half an inch, and expanded into a small flat handle at its proximal end. The curved extremity is flat, with cutting edges, while the greater portion of the length of the needle has a groove on the side corresponding with the convexity of the curve. The needle is used by passing it through the lips of the wound in the position to be occupied by the pin, after which the latter is inserted along the groove and the needle removed. The pins are there held in position by a thread arranged in the form of a figure 8.

The needle constructed by Dr. G. S. Bryant, of this city, differs from the above in being bent at a double angle near its proximal end, by means of which the handle occupies a higher plane than the grooved part of the needle. Another ingenious needle, invented by Dr. Bryant, is the vesico-vaginal needle, which will be explained hereafter.

The **Aneurism-Needle**, represented in Fig. 10, is employed to effect the ligation of an artery that has retreated within the tissues beyond reach. In this case it becomes necessary to cut down upon the bleeding artery at the most convenient point above the wound, and tie it at that point. After the sheath of the vessel has been opened, the needle is used by passing its extremity, armed with a double ligature, under the artery and out on the opposite side; one division of the ligature is then secured between the fingers, or by a forceps, and drawn out upon one side, while the other portion follows the needle as it is withdrawn from the other side of the wound. The artery is then tied.

Fig. 10.

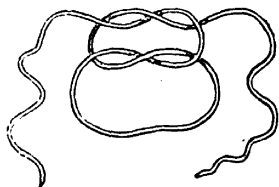


A **Ligature** is a strong cord, usually of silk, and used to arrest the hemorrhage of a wounded vessel; it is also occasionally employed in the removal of tumors.

The kind of knot to be preferred is a matter of some moment: I regard what is called the "Surgeon's Knot," which is made by passing one end of the ligature *twice* around the other, as highly objectionable, as it is exceedingly bungling, and possesses no superiority over the *double* or "sailor's knot;" unless, indeed, the operator neglects to have his ligatures properly waxed—a *precaution which should never be overlooked*—in which case it is not quite so liable to slip as the "sailor's knot" while the subsequent part of the knot is being made. The "sailor's knot" is much more rapidly executed, and presses more uniformly upon the entire circumference of the vessel. It is made in the following manner: 1. Pass the end of the ligature held in the right hand, *from* you, once around the corresponding end of the ligature held in the left hand. 2. Pass the end of the ligature in the left hand, *toward* you, once around the other end, and the knot is

Fig. 11.

complete, Fig. 11.

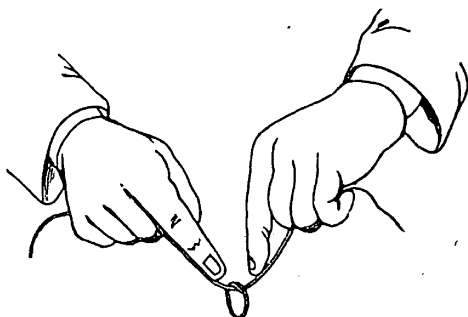


It is imperative in all cases that the ligature be drawn with the requisite degree of firmness to cut entirely through the internal and middle coats of the artery, in order that sufficient inflammatory action may be produced in the vessel to agglutinate its sides, and thus render the channel impervious. One end of the ligature should then be cut off within about a quarter of an inch of the knot, to diminish the amount of irritating matter left in the wound. The length of time during which the ligature should remain around the artery will vary according to the size of the latter; generally from five to twenty days, may be considered as

elapsing before the external coat becomes severed at its point of constriction. The ligature may be gently twisted and drawn upon, in order to favor its release, as sometimes it is retained by the granulations in which it is imbedded. No *force*, however, should ever be used, particularly when large arteries have been ligated, lest an unexpected secondary hemorrhage occur.

The manner of holding the ends of the ligature, that the knot may be drawn firmly, is represented in Fig. 12:

Fig. 12.



Under the head of Apparatus of Dressing, also, the operator should, in the more important cases, include Basins, Towels, Buckets, Sponges, etc. The latter, as obtained in the shops, are not fit for use without being subject to a cleaning process. This consists, first, in its maceration in boiling water, and subsequent beating, to remove the calcareous particles; they should then be macerated in water acidulated with about one thirtieth of its bulk of chloro hydric acid; dried and beaten again, and then bleached by exposure, when moist, to the vapor of chlorine, or some other discolorizing agent. They are then properly prepared for use.

The **Pieces of Dressing** include Lint, Charpie, Cotton, Tow, Ointments, Liniments, Compresses, Maltese Cross, Shields for Amputations, Adhesive Strips, Collodion, Plasters, Poultices, and the Application of Water.

Lint is a soft, fleecy substance, obtained by unraveling old linen. The linen selected should be soft and clean, from use and washing—as, for example, an old *table-cloth*. The "**Patent Lint**," as prepared by druggists, is in no wise preferable to the **Domestic Lint**; the latter can be made at a moment's notice, by scraping the

surface of the linen previously put on the stretch, with a sharp knife. They are both employed as primary dressings, either dry, spread with ointments, or saturated with some kind of lotion.

Charpie is made by collecting the threads torn entirely apart from pieces of linen four or five inches square. The linen from which it is obtained should always be new, as it has been established that new linen absorbs better than old. It is commonly divided into two kinds, according to the length and fineness of the thread composing it: that which is long and coarse being of service to prevent the closing of sinuses or fistulæ; while the more fleecy, finer kind is placed in direct apposition with the part, particularly if the surface require stimulation.

Many arbitrary names have been applied to the various forms which charpie may be made to assume as an element of surgical dressings. Thus, we have the Pledget, Roll, Tent, Mesh, Bullet, Tampon, Pellet, etc., each of which has its peculiar use and advantages.

The **Pledget** is a mass of charpie, with the threads arranged parallel with each other and the ends folded underneath. It is then pressed by the hands into the required shape. After being neatly adapted to the part it is designed to cover, it is usually spread with cerate, care being taken not to make it so thick and bungling as to heat the surface of the wound, nor yet so light as to admit of its becoming immediately saturated with the discharges.

The **Roll** is a smaller mass of charpie, rendered cylindrical by rolling it between the hands, and then being firmly tied with a cord in the middle. It is chiefly used to arrest hemorrhage, by pressure, from deep-seated vessels, or to absorb the secretions from wounds or cavities. A director, probe, or dressing-forceps, may be found necessary in order to carry it sufficiently far into deep wounds. And for convenience of withdrawing the mass, the string attached to it may be left projecting from the orifice.

The **Tent** is made by twisting a mass of charpie into the form of a cone. It is used to dilate fistulous openings where only a moderate degree of dilatation is required. It is, however, much inferior to the **Sponge Tent**, which is prepared by soaking common sponge in melted beeswax; permitting it to cool and harden while under moderate pressure, and then slicing it into pieces of the required size. The dry, compressed sponge, prepared by allowing it to

remain in a vice for a few hours, is highly recommended, and is very useful.

The **Mesh** is formed of threads of charpie, placed parallel with each other, then bent upon themselves and left loosely floating. It is used more especially in the treatment of fistulæ in ano. When thus employed it should be covered with some lotion or cerate and introduced into the cavity on the point of a probe. It acts by preventing the orifice from healing, thus enabling the cavity to granulate from the bottom.

Bullets are made by rolling charpie between the hands until it acquires the form of a ball. They are exceedingly porous, and hence very absorbent; and are of use in filling cavities and preventing matter from burrowing.

When a number of bullets are placed together for the purpose of distending a cavity or of arresting hemorrhage, they assume the name of **Tampon**. A large ball alone is also sometimes called a tampon. They are used in gonorrhœal inflammations of the vagina; in leucorrhœa; and in uterine hemorrhage. In arresting the latter, especially if it occur from violence, they may be made of the *Boletus Ignarius*, or Puff-ball, and used with the most marked success.

The **Pellet** consists of a ball of charpie inclosed in a piece of soft linen and firmly tied. It is frequently employed in the treatment of umbilical hernia of children, where it supplies the place of a truss. It is also sometimes used as a tampon.

Cotton is much inferior to charpie as an article of surgical dressing, in view of the fact that it is less absorbent and much more irritating; though during the late war it has been very neatly prepared and quite extensively used in the army as a substitute for lint and charpie. Its chief recommendation, however, is its use as a covering to extensive superficial burns, to protect their sensitive surface from the action of the air and at the same time absorb the discharges. It is highly useful, also, to form a soft bed upon which to rest an injured part; to prevent unpleasant pressure and excoriation from bandages and other apparatus; and to envelop parts when the natural temperature has become depressed.

Tow is of very questionable utility as an article of dressing, as it is exceedingly harsh and irritating; and if the pledget used be too

thick, it becomes heating to the wound, and union is thus retarded. It may be employed, however, as an outer dressing to stumps which are discharging copiously, in order to protect the bed.

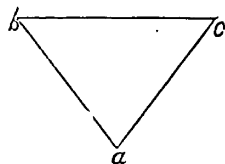
Ointments are any soft, unctuous substance or compound of a consistence that renders them conveniently applied. They are much less frequently used than formerly.

Liniments are designed to be applied to the skin by friction with the hand, or with soft flannel. Oil should constitute the basis, and with it a variety of ingredients may be combined that it may be thus rendered soothing or irritating, as required.

Compresses are made of various materials, as linen, muslin, flannel, calico, etc., and usually applied over other dressings. They have received a variety of names, according to their form and the indications which they are designed to fulfill. Thus, we have the Square, Oblong, Triangular, and Cribriform; the Maltese Cross, the Half-Maltese Cross, the Single and Double Split Compress, the Perforated, the Graduated, and the Pyramidal.

The **Square Compress** is that in which the substance used is doubled so that the length and width are equal. When folded so that it is twice as long as it is wide, it constitutes the **Oblong Compress**, and is used in surrounding the trunk or limbs.

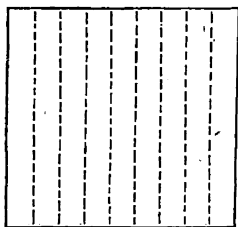
Fig. 13.



If the square piece be folded by uniting two of its angles, it forms the **Triangular Compress**. This is of excellent service in confining dressings to stumps, where it is necessary to change the dressing frequently without disturbing the limb. It should be of sufficient size to surround the limb, and should be applied as follows: Place the stump in the center of the side, *b c*, Fig. 13; then, turning the apex *a* over the end of the stump, the other points, *b* and *c*, should be turned up and the ends fastened by the use of pins. When it is desirable to renew the poultice, or whatever other dressings are used, withdraw the pins, and, turning back the ends of the compress, the surface is readily exposed.

The **Cribriform Compress** is made by folding a square piece of linen several times upon itself in the form of a square, and then nicking the sides with the scissors, removing small triangular pieces.

Fig. 14.



On opening it, we shall have the form represented in Fig. 14. This spread with cerate constitutes a very elegant dressing as applied to suppurating surfaces.

The **Maltese Cross**, so named from its form, is prepared by folding a square piece of linen through the middle or one of its sides, then doubling this so as to form a square; after which, join either of the two angles to form a triangle, as in Fig. 15. From the hypotenuse of this triangle remove nearly half an inch from the apex, which

Fig. 15.

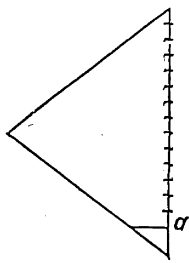
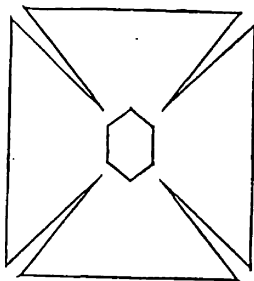


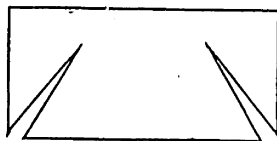
Fig. 16.



consists of folds without free edges; this leaves a space in the center. Then make an incision along the hypotenuse to within half an inch of the line *a*. On opening the linen we have the cross complete, Fig. 16. It is used as a direct application to stumps, being previously spread with cerate.

The **Half-Maltese Cross** makes a convenient dressing for stumps at the shoulder or hip-joint. It is made by folding a piece of linen in the form of an oblong square, and then carrying an incision from the two angles having free edges to within a couple of inches of the folded sides, Fig. 17. By opening the linen, doubled and cut in this manner, it will also form the cross, Fig. 16. The student should practice making them of paper, that he may be expert when called upon to make them for actual use. Indeed, the same may be urged

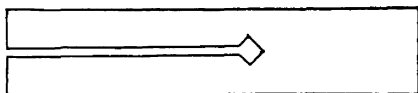
Fig. 17.



of many of the dressings, as repeated practice is one of the essential elements of success.

The **Retractor** is made from an oblong piece of muslin, and may have *two or three tails*, according as there is one or two bones to be divided by the saw.

Fig. 18.

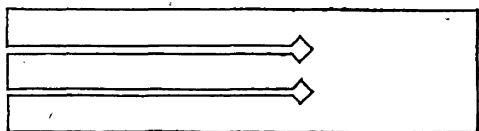


The *retractor of two tails*, Fig. 18, is employed to protect the soft parts where there is but one bone to be divided.

In making an application of it, draw the tails downward on each side of the stump, at the same time drawing the body of the retractor upward over the stump. The muscles are thus forced backward and protected from the action of the saw.

The *retractor of three tails*, Fig. 19, is applied in a similar manner where there are two bones to be divided—the middle tail passing through the interosseous space.

Fig. 19.



The diamond-shaped opening, at the end of each incision, is designed to adapt the retractor more perfectly to the bone.

The **Perforated Compress** consists of muslin folded several times upon itself, in the center of which a circular opening is cut. By means of this opening, points which have a tendency to slough, are relieved of pressure; as, for example, the internal condyle in injuries of the elbow; the trochanter of the femur; and the heel in fractures of the lower extremity.

The **Graduated Compresses** are of several varieties; the difference consisting in the manner in which each is folded. In the first form, each fold is so arranged as not entirely to cover the one previously made. It may be graduated at one or both extremities. Fig. 20.

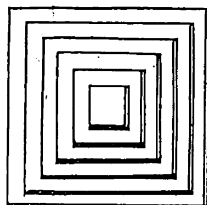
The **Pyramidal Compress** may be either square or oblong. It is very neatly made by placing square pieces of muslin, each smaller than the preceding, one upon the other, and then fastening them

together, which form a pyramid, Fig. 21. They are used for making pressure upon particular parts, as in cases of hemorrhage from deep-seated vessels.

Fig. 20.



Fig. 21.



Adhesive Strips are designed to facilitate the union of wounds by approximating their edges and protecting the surface from the action of the atmosphere. They constitute one of the most indispensable articles of dressing employed by the surgeon.

For application, the strips should usually be cut off one-half or three-quarters of an inch in width, and warmed by being held near a fire, or by wrapping its unspread surface around a bottle of boiling water, which is preferable. The strip should then be applied first to the most depending portion of the wound, in order to draw it up to the other, and should never be applied from above downward. Care must also be exercised that a proper space be left between the strips to admit of the free escape of the discharges. Owing to the fact that the common adhesive plaster is irritating to the skin, sometimes producing an erythematous inflammation, and occasionally a papular or a vesicular eruption, objections have been raised against it, and the "isinglass plaster" proposed as a substitute. The latter is prepared principally by Mr. Husband, of Philadelphia, by spreading upon oiled silk, or silk glazed on one side only, a solution of isinglass in spirit. The advantages of this plaster consist in its unirritating property and its transparency, whereby the condition of the parts can be seen without removing the strips. Tallman's Glycerine Plaster, manufactured by Tallman & Collins, Janesville, Wisconsin, and which I used somewhat extensively in the army, is quite equal, if not superior, to the plaster prepared by Mr. Husband. Its important qualities are: its soothing properties of glycerine, its transparency, and adaptation to suppurating surfaces, as well as dressing to original wounds; it does not injure

by age or change of climate. It is prepared for application by previously moistening it with a sponge wet with warm water.

Collodion, a very useful and convenient adhesive material, is made by dissolving gun-cotton in sulphuric ether. After approximating the edges of a superficial wound, it is generally sufficient to paint the surface a few times with a camel's-hair pencil; but in more severe injuries, it is well to lay strips of muslin, linen, or kid, saturated with the solution, on the wound, and then press upon the part until dry. The collodion can readily be removed by dissolving it away with ether.

Plasters are made of various substances; as, for example, the *soap plaster*, which is very mild and unirritating, and preserves the integument soft and moist, being, also, an excellent preventive of excoriation. The *mercurial plaster* is sometimes employed as a resolvent of tumors and other indurations. The *belladonna plaster* is occasionally used as a soothing as well as a curative agent. The preparation of them belongs properly to the apothecary, though the surgeon should regard it his duty to see that they are of the requisite shape to fit accurately the part to which they are to be applied. In adapting a plaster to the female mammæ, for example, a circular piece is required, with a round opening in the center large enough to admit the nipple, while the circumference of the piece should have several incisions reaching one inch toward the center. In general, however, plasters are little used in Homœopathic practice, their use being superseded by the administration of internal remedies and external *medicated* lotions.

The **Poultice** or **Cataplasm** was formerly one of the most common articles of dressing, both in domestic and professional practice. It is made of a variety of substances, and is intended to cover injured surfaces, the kind of poultice used being varied according to the object to be attained by its application.

The **Emollient Poultice** may consist of bread and milk, bread and water, bran or corn-meal with water, or of flaxseed meal. The latter forms a very excellent poultice. It is prepared by pouring sufficient hot water upon the meal to give the mass a soft consistence. It should then be spread upon a piece of muslin, and leveled smoothly and of a uniform thickness of one quarter or half an inch. The edges of the muslin should then be reflected upon it on every

side for the space of about half an inch, so as to form a kind of frame. This gives the poultice a very neat and elegant appearance, and prevents the adhesion of the edges, or their hardening, while it facilitates its removal from the injured part. Every poultice should invariably be renewed before it becomes dry and hard. Its moisture can be retained much longer by covering it on the outside with a piece of oiled silk, which it is always advisable to do.

The **Stimulating Poultice** is made of different substances, as boiled carrots, grated to a pulp; raw potatoes, grated and applied cold; grated horse-radish; slices of garlic; black pepper; yeast alone, or yeast or porter with corn-meal; solutions of chloride of lime or of soda, of creosote, or of common soap.

The **Mustard Poultice** or **Sinapism** is made by pouring water upon the flour of mustard, thus reducing it to the consistency commonly employed for the table, and then spreading it thinly upon muslin.

Narcotic or Soothing Poultices are made of poppy-heads or powdered opium, or the bruised leaves of belladonna; of hops or chamomile flowers, inclosed in a flannel bag wrung out of hot water.

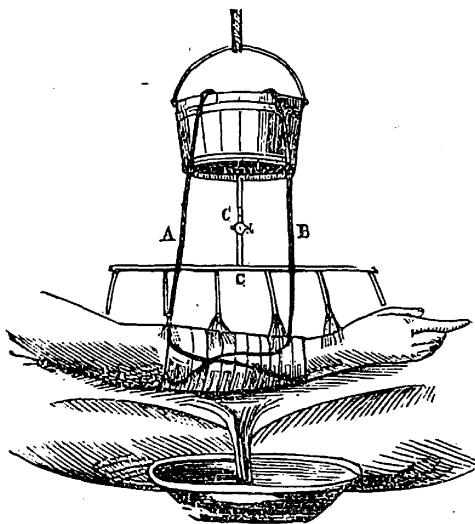
It may, however, be remarked that "water dressings" have in a great measure been substituted for the various kinds of poultices, ointments, and cerates formerly employed so frequently. This is so much the case that many physicians have dispensed with them almost entirely, relying instead upon the use of water and the internal administration of appropriate remedies.

Water Dressings may be cold or warm, simple or medicated. *Cold water* is intended to keep the parts constantly moist, and by its physiological effect diminish inflammatory action. It is of invaluable service in compound fractures, gunshot wounds, sprains, dislocations, and after amputations, especially if there be excessive action. In compound fractures, gunshot wounds, amputations, and suppurating surfaces, the water should be medicated with *calendula*; whereas, *arnica* is more applicable to sprains, dislocations, bruises, etc.

Irrigation is successfully effected by suspending a vessel, containing water of the required temperature, at a convenient height over the injured part, and then forming a communication between the latter and the water in the vessel, by means of strips of lint

twisted together, or, what is better, pieces of cotton wick; the wick, being wet previous to its application, forms a siphon. In order to prevent the clothes of the patient or the bedding from becoming wet, the limb, previously covered with folds of moistened lint or soft linen, should be laid upon a pillow protected by a piece of oil-cloth, so arranged as to form a sort of gutter, along which the water may pass into a vessel below. A still more preferable method of accomplishing the same purpose is secured by the use of an apparatus with a stop-cock, by which the size of the stream can be regulated at pleasure, Fig. 22. The sensations of the patient should invariably be consulted respecting the propriety of continuing or relinquishing this mode of treatment. In general, it may be continued so long as it is agreeable to the patient; but it should be at least *suspended*, if not entirely *dispensed with*, provided it induce chilliness or an increase of pain.

Fig. 22.



The **Douche** or **Shower-Bath** is sometimes applicable to cases where it is desired to invigorate the vital functions generally, or to increase the activity of any particular part of the body. Its good effects are most clearly manifested in local paralysis, as of the lower portion of the spine, of the sphincter muscle of the anus, or of the neck of the bladder; also, in a similar condition, of some

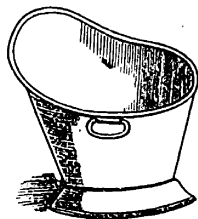
of the voluntary muscles, as the deltoid, for example, resulting from an injury. It can be conveniently applied by pouring the water from the nose of a tea-pot or pitcher, having the vessel used elevated to a suitable height above the patient.

Bathing constitutes a very important adjunct in the treatment of many surgical diseases, but should always be conducted with care, as otherwise it may prove a source of formidable mischief. The temperature of the bath may vary from 33° F. to 112° , according to the peculiarities of the case. The feelings of the patient, guided by the judgment of the surgeon, form the only safe and rational guide to the temperature of the bath to be employed; since a degree of temperature which would prove agreeable and of service to one person, might produce a severe and injurious effect upon another.

The **Warm or Hot Bath** is occasionally used as a depressing agent in overcoming violent pain in excessive nervous excitement; spasmodic muscular contraction in the reduction of dislocations; spasms of the neck of the bladder; to assist in the return of hernial protrusions, and the like.

Partial Baths, as, for example, the pediluvium or foot-bath, the hip-bath, the hand-bath, etc., are often used with benefit. The *hip-bath* is a very effective agent in acting upon the lower part of the spine, and particularly upon the pelvic organs. It may be taken in any vessel of convenient size, though one of the form represented in Fig. 23 has the advantage of being so made as to afford support to the back while sitting. In using the *hand-bath*, the water should be applied hastily, not keeping the parts long exposed; after which the surface must be carefully rubbed with dry towels, when a glow may be produced by friction with the *dry hand*, which is preferable to the use of a towel or flesh-brush for this purpose.

Fig. 23.



APPLICATION OF DRESSINGS.

By the observance of *method* in the application of dressings, the surgeon can very materially lessen his labor, while at the same time he will be in no danger of injuring his reputation through negligence or want of knowledge as to what is required in any particular

case. Though it is impossible to give directions which would prove applicable in every instance, still, general rules can be prescribed that will be advantageous to the young surgeon in enabling him to anticipate the awkward position he might be suddenly placed in by not making a proper selection of assistants, or by failing to have in readiness the necessary articles which are to constitute the dressing.

1st. A suitable number of reliable and efficient assistants must be procured, to each of whom special duties shall be assigned, with the instruction that *they are to observe these duties, and nothing else*. This prevents confusion. 2d. Before exposing the affected part, the patient should be placed in such a position that the assistants can perform what is required of them without interfering with each other, thus preventing hasty, inconsiderate movements. 3d. The surgeon, as a general rule, should place himself on the outside of the limb, with his face to the patient. 4th. The dressings to be employed should be prepared beforehand, not omitting to have sponges, vessels of water, warm or cold, castile soap, towels, etc., in readiness. 5th. During the dressing, the bed and clothes of the patient should be protected by water-proof cloth, or by so holding the part that the discharges and the water used in cleansing may flow into a vessel. 6th. Let the surgeon exercise great care lest he leave the patient in such a position as to occasion unnecessary fatigue.

SECTION II.

PREPARATION AND APPLICATION OF THE BANDAGE

By **Bandaging** is meant the confining of dressings or other surgical apparatus in their proper place, by means of pieces of muslin or other material.

Bandages are of several kinds, deriving their names either from the direction which they take, from their peculiar form, or from the particular purpose they subserve. Bandages are simple when formed by the application of the roller; compound, when made from one or more pieces adapted to the size and conformation of particular parts. The former kind is subdivided into the

Circular, Oblique, Spiral, Figure of 8, Spica, and Recurrent; the latter, or Compound, into the Uniting, Dividing, Compressing, Expulsive, Retaining, etc.

§ 1.—Simple Bandage or Roller.

The **Roller** is usually prepared from muslin, calico, linen, flannel, cloth, or gum-elastic, by tearing it from the piece into bands from one to four or more inches in width, and from a few inches to ten or twelve yards in length. It should be free from hems, soft, pliable, and unglazed, to prevent it from slipping. Rollers are of two kinds, according as one or both ends are wound into cylinders.

The **Single-headed Roller**, Fig. 24, consists of two extremities; one of which, the terminal, is in the center of the cylinder, the free extremity being the part remaining unwound. Between the two ends is the body, and the two surfaces, an external and an internal.

The **Double-headed Roller**, Fig. 24, consists of the same parts as the single one, with the exception of the free or initial extremity, which is also wound into a cylinder.

The rolling of the bandage may be accomplished with a machine, or by hand. A very simple and easily-constructed machine for this purpose is represented by Fig. 25; one end of the roller being

Fig. 24.

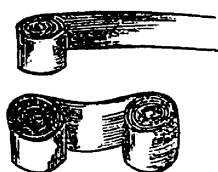
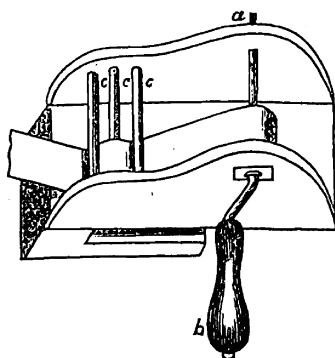


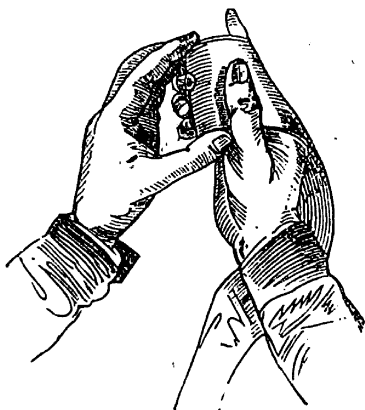
Fig. 25.



placed on the spindle, *a*, the other is to be held in the left hand to direct its course, and thus insure its being wound evenly, while

the crank, *b*, is turned with the other hand. Two or three round cross-bars are so arranged as to assist in winding it firmly. When the winding of the band is completed, grasp the roller tightly and withdraw the spindle. In hospital practice, where many bandages are required, the use of a machine will be found very convenient and economical. The surgeon, however, is not always able to avail himself of such aid when bandages are required; hence, a knowledge of the proper mode of manufacturing a roller by hand becomes a matter of importance. The following directions will show the process to be very simple, and a little practice will enable him to roll them rapidly: Place the terminal end of the band upon the thigh, and double it five or six times upon itself, to form an axis around which the remaining part of the band can be rolled. Then roll it between the hand and thigh a few times until it becomes sufficiently firm to be held between the thumb and finger without yielding. Then allow the body to run over the right forefinger, seizing it firmly between this finger and the thumb, so as to make traction. Now cause the cylinder to revolve by means of the last three fingers of the hand in which it is held; at the same time the thumb and finger holding the body of the roller should be made to revolve partially around the cylinder. By this compound movement the roller can be very quickly and neatly made. Figure 26 will

Fig. 26.



explain the directions.

A roller designed for the body should be twelve yards long and usually four inches wide; when intended for the head, five yards in length by two inches in width; when for the extremities, eight yards in length by two to three inches in width, according to the size of the limb. A finger or penis bandage should be about one inch wide. In applying the roller, the surgeon commonly carries it from left to right, or

from without inward for the right arm or leg, and from within outward for the left. The roller being unwound to the extent of three or four inches, the cylindrical part is grasped firmly between

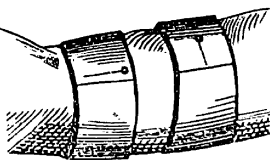
the thumb and fingers, so that it lies very nearly in the hollow of the hand; while the initial extremity is held in the other hand by pressing the fingers firmly against the palm, the thumb pointing toward the side from which the turns are to be carried. Now, placing the *external surface of the initial end* upon the limb, retain it by the pressure of the fingers until one or two turns are made around the part, so as to secure this end, after which the roller may be continued up the limb in the manner to be described hereafter.

§ 2.—The Circular Bandage

Is formed by horizontal turns of a roller, each of which overlaps, or very nearly so, the preceding one, Fig. 27. These bandages are very simple, and are applied to the Forehead, Eyes, Arms, and Lower Extremities. The terminal end of a bandage, whether circular or of any other kind, may be fastened by the use of pins, or by employing small, narrow bands. The pins may be applied in a line with the length of the roller or transversely, Figs. 27 and 28. If, however, the pin be placed as represented in Fig. 28, the head looking from the end of the roller, it will be likely to be withdrawn by the action of the roller itself. Some surgeons prefer securing the terminal end of the roller by means of tape, or by slitting the end of the bandage into two strips, tying them in a boy-knot; but this mode of fastening is only preferable in bandaging the penis, fingers, or toes.

Fig. 27.

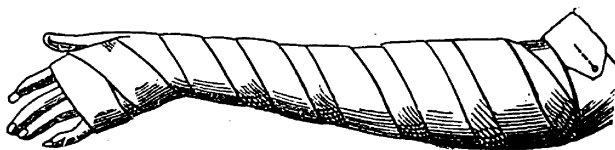
Fig. 28.



§ 3.—The Oblique Bandage

Differs from the circular in that it ascends the limb rapidly and very obliquely, leaving an interval between the turns, Fig. 29.

Fig. 29.

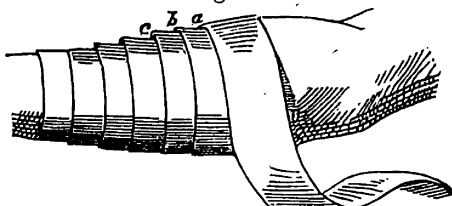


Use.—It is employed principally to retain dressings, though it is sometimes used with other bandages in particular cases, to which reference will be made hereafter.

§ 4.—The Spiral Bandage

Ascends the limb gradually, the turns being in such relation to each other that each succeeding one covers in a portion of the turn which preceded it, thus completely enveloping the surface to which it is applied. Owing to the circumstance that the parts requiring this bandage are more or less conical, especially the extremities, it is plain that, in ascending the arm—for example, passing from the apex of a cone to its base—one edge of the roller will press upon the surface, whereas the other will be entirely free, thus making the openings called *gaps*—*a, b, c*, Fig. 30. The injury to result from having a bandage thus applied is apparent; hence, in order to equalize the pressure, the roller is, at each turn, half-folded upon itself, making what is called a **Reverse**, which can not be neatly and properly made without frequent practice; and, as it is a matter of importance, the following rules are given:

Fig. 30.



Rules for making the Reverse.—1st. Holding the roller as previously directed, make the simple spiral, *without the reverse*, so long as both edges of the roller press equally upon the part; when the swell of the muscles is reached, place the left forefinger on the middle of the bandage where the fold is to come, in order, simply, to prevent the turns already made from becoming relaxed, Fig. 31.

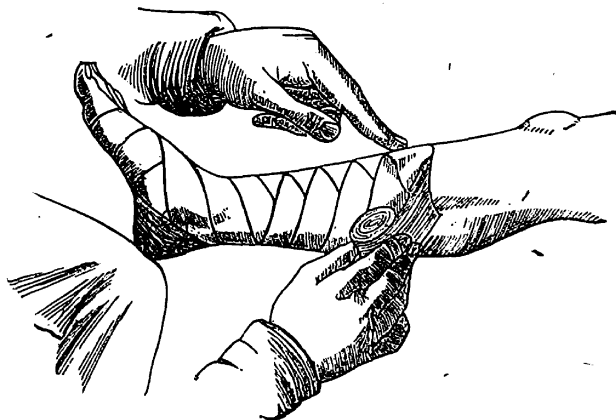
2d. Slacking the roller between this point and the cylinder, rotate the latter on its long axis by pronating the hand, taking care not to allow the cylinder to sink below the level of the limb till the reverse is complete.

3d. Keep the edges parallel, permitting each succeeding turn to cover in about one-third of the preceding one.

4th. While making the reverse, keep the body of the roller perfectly slack, drawing it sufficiently tight *after the fold is made*.

These reverses are wholly indispensable where the limb is not uniform in size; and as their formation is the most difficult point in the application of the roller, it is proper to urge the necessity of the surgeon becoming thoroughly acquainted with the above rules. A little actual practice is all that is required to become expert, recollecting especially that, *while making the reverse*, no traction should be made, nor the cylinder sunk below the limb, nor held more than six inches from the middle of the turn.

Fig. 31.



The degree of tightness to be observed in the application of the roller is a question worthy of attention; for, unless a bandage be properly adjusted, it had better be dispensed with entirely. If it be too loose, it can not fulfill the indications presented, and if too tight, may produce gangrene. But above all things should the surgeon avoid the culpable practice of wetting the bandage in order to make it adapt itself more perfectly to the part. This practice is liable not only to produce the most intense pain, but is likely also to occasion gangrene, thus exposing the life of the patient. It is not possible to calculate how much the roller will shrink in drying, and hence no one can estimate the degree of pressure which will be produced. But the degree of traction requisite can only be deter-

mined by the peculiarities of each individual case; though it may be stated, in general, that a bandage is applied in accordance with the indications to be pursued, when it lies evenly and presents a finished appearance, relieving the sufferings of the patient, and which does not of itself become a source of irritation and pain in the course of two or three hours.

There are repeated examples to show that the tendency of all inexperienced dressers is to draw the bandage too tightly, instead of falling into the opposite extreme. Practice only can make perfect; and hence it will afford a valuable lesson to the young surgeon to give some other person the benefit of a roller, to determine the amount of traction that can be sustained without inconvenience; or, what will be still more instructive, let him permit the second person to apply the roller to one of his limbs, when the pain which will be occasioned through want of skill will be likely to suggest healthful reflections respecting his own want of experience.

VARIETIES OF THE SPIRAL.

The Spiral has been divided into several kinds, according to the parts of the body which it is designed to cover. Thus, we have the Spiral of the Chest, of the Abdomen, of the Upper Extremity, of the Finger, of all the fingers or Gauntlet, of the Penis, and of the Palm or Demi-Gauntlet; together with the Spiral of the Lower Extremity, including the Spiral of the Thigh, of the Leg, of the Foot, and of the Toes. We have also the French Spiral, which is but a slightly different form of bandage from that last named.

The ability skilfully and neatly to apply and adjust the roller is of very great importance to the surgeon; and the time which the young dresser devotes to its acquisition is well spent. It can only be gained by frequent practice. Verbal descriptions, and the best executed illustrations, should be considered merely as guides and aids; they can not impart practical skill, any more than the perusal of volumes on anatomy, to the exclusion of dissections, can render the student acquainted with the mysterious construction of his material frame. Let each one, therefore, spend a few leisure moments every day, with some companion, in the practical application of the roller. At first, reference to some book on bandaging will be necessary, but after a certain degree

of skill has been acquired, the volume may be laid aside; the student's good sense, and the familiarity which he has already gained with the mode of bandaging, combined with his knowledge of the particular object to be attained in each case, will be his best guides and his best adviser.

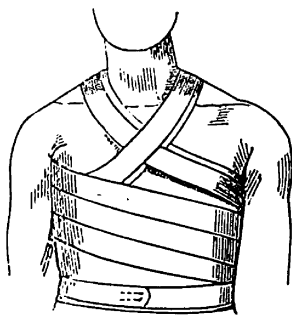
1. *Spiral of the Chest.*

This bandage requires a roller twelve yards in length by three inches in width.

Application.—Place the patient in such a position as will make it convenient to pass the roller around the back. Confine the initial end of the bandage on the waist by making one or two circular turns from left to right; then direct the succeeding turns spirally up the chest, covering in one-third of each previous turn, until the axillæ are reached; from the left axilla conduct the roller obliquely in front of the chest to the base of the neck, around which pass to the right axilla; make one other similar turn, after which descend the chest by oblique turns to the point of starting. In the cut, Fig. 32, the terminal end of the roller is represented as passing from right to left instead of from left to right.

Use.—To confine dressings on the thorax in case of wounds; to assist in the coaptation of the fragments of fractured ribs; and in fracture of the sternum. In the two last cases, compresses must be placed on the projecting points.

Fig. 32.



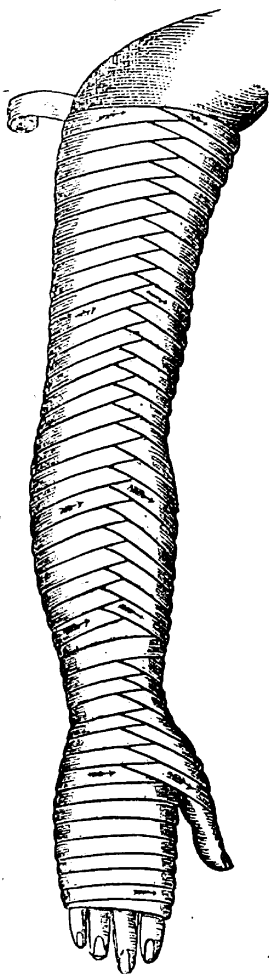
2. *Spiral of the Abdomen.*

Application.—Commence at the lower part of the chest, and carry the roller obliquely around the abdomen, making one or more turns around the thighs to prevent it from slipping upward.

Use.—To produce pressure, as in certain cases of tympanitis, or after the operation of tapping in ascites. If very firm pressure be desired, the double-T bandage may be used.

3. *Spiral of the Upper Extremity.*

Fig. 33.



A roller for this extremity should be eight yards long by two or two and a half inches wide.

Application.—Having covered the fingers by the gauntlet (Fig. 34), if it be necessary, give one or two circular turns around the wrist to secure the end of the bandage; then pass the roller obliquely over the back and palm of the hand to the extremity of the fingers, and then ascend to the phalangeo-metacarpal joint of the thumb by three spiral turns without the reverse, Fig. 33; cover this and the wrist-joint by a figure of 8 (to be described), and ascend the limb by reversed turns till the elbow is reached. Cover the elbow-joint with the figure of 8, if it is to be flexed, otherwise use the simple spiral turns with the reverse, continuing the bandage to the shoulder. Compresses to be used when required.

Care must be exercised not to apply too much traction, lest gangrene or ulceration ensue as a consequence. The only difficulty experienced in the application of this bandage is in making the figure of 8 neatly at the elbow.

Use.—It is employed in the treatment of varicose veins, aneurisms, fractures, etc.

4. *Spiral of the Finger.*

This is usually known as the *finger bandage*, and should ordinarily be about one yard in length by one inch in width.

Application.—Fasten the initial end of the roller at the wrist by circular turns; then cross the back of the hand, descending to the end

of the affected finger by very oblique turns. Commencing at this extremity, ascend the finger by making the spiral with reverses, terminating the bandage by a circular sweep at the point of starting.

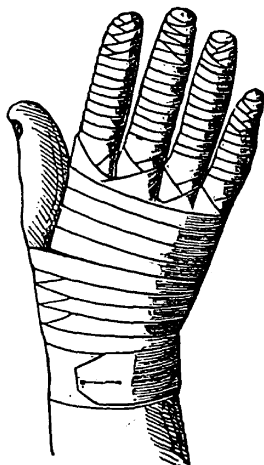
Use.—To retain dressings.

5. *Spiral of all the Fingers, or Gauntlet.*

The gauntlet requires a roller eight yards long by one inch wide.

Application.—Commence at the wrist by making one or more circular turns, then cross the back of the hand, descending to the end of the index finger by oblique turns; now ascend to the base of the finger by spirals with the reverse; then pass to the middle finger and descend it by oblique turns; when at the extremity, return by making the spiral turns as before, and so on till all the fingers are covered, terminating the roller at the wrist, where it may be fastened with a pin, Fig. 34.

Fig. 34.

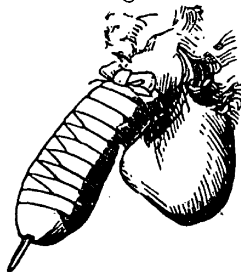


Use.—This bandage is applicable when two or more fingers are injured, or when there is danger of their becoming united if allowed to remain in contact, as in cases of burns; also, in fractures and dislocations.

6. *Spiral of the Penis.*

Application.—Commencing at the glans penis, form the spiral with reverses, terminating at the root of the organ, where the terminal end of the roller may be fastened by slitting it into two parts, which tie in a bow-knot, Fig. 35.

Fig. 35.



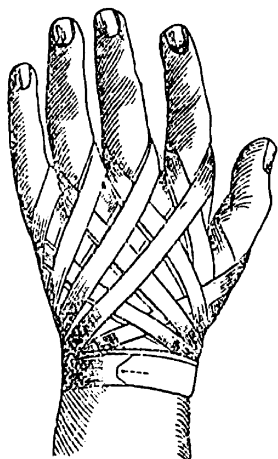
Use.—It is employed in retaining dressings, as in cases of chancres and other sores external to the prepuce; also, to compress the urethra when necessary, a catheter being left in it.

7. *Spiral of the Palm, or Demi-Gauntlet.*

Application.— Confine the initial end of the roller by circular turns, round the wrist, passing from its ulnar to its radial side; then carry the roller obliquely across the back of the hand (or the palm, according to which side the dressing is to be retained); thence to the radial margin of the forefinger; encircle its base, and continue the roller around the wrist; pass in like manner, by oblique turns around the base of each finger, including the thumb, terminating the bandage at the point of starting, Fig. 36.

The above is similar to the directions given in surgical works for the application of this bandage; but the figure used by way

Fig. 36.



of illustration, Fig. 36, does not correspond, as a critical inspection will plainly show. In order that the figure may constitute a correct guide, it should be studied in connection with the following directions, which are equally as simple as those already given, and may be adopted if preferred: Having the hand prone, fix the initial end of the roller by circular turns, commencing at the top of the wrist, its radial side; upon reaching the ulnar side the second time, carry the roller under the wrist to the carpo-metacarpal joint of the thumb; encircle its base, pass obliquely across the back of the hand; thence around the ulnar margin of the wrist, passing to the carpal

extremity of the radius; from which continue onward to the cubital side of the base of the little finger, encircle it, and pass again to the ulnar margin of the wrist, thence to its radial side; from which point continue obliquely across the back of the hand, to pass around the root of the third finger; and so on with the two remaining fingers, terminating the bandage by a circular sweep at the wrist.

8. *Spiral of the Lower Extremity.*

This bandage is composed of two rollers, each seven and a half yards long by two and a half inches wide.

Application.—The patient may be seated with his heel resting on the point of the surgeon's knee, or he may assume a horizontal position, having his limb supported by assistants. The surgeon, placing himself on the outside of the limb, if he be standing, should commence by one or more circular turns from without inward, immediately above the malleoli. Then descend from the external malleolus obliquely across the instep, and under the sole of the foot to the extremity of the little toe; from this point cover in the foot to the instep, by spiral reversed turns, which are to be continued up the leg to the knee, when the figure of 8 should be employed. With a second roller the remaining portion of the limb may be covered, Fig. 37.

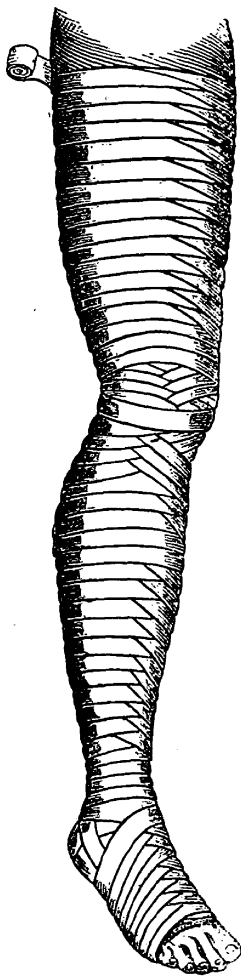


Fig. 37.

Use.—It is employed in the treatment of fractures, ulcers, varicose veins, and cedema.

The only objection which can be raised to this mode of applying the bandage is, that it leaves the heel uncovered; and where there is firm pressure—as in the treating of varices, ulcers, etc.—this part is disposed to swell and become painful if left unpro-

Fig. 38. tected; hence, in particu-



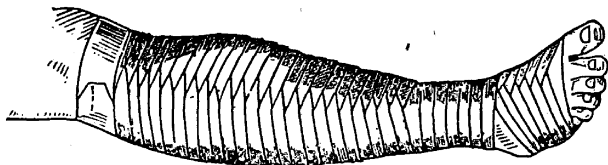
lar cases it is advisable to cover it, which may be accomplished as follows: Confine the initial end of the roller, covering the foot to the instep, as before di-

rected; from the top of the instep pass directly over the point of the heel to the side of the ankle; thence around the front of the instep and the sole of the heel, covering in the anterior half of the previous turn; continue on to the outer malleolus; and thence in front of the joint again to the sole and point of the heel, thus forming around the leg, instep and sole a figure of 8, Fig. 38.

9. *French Spiral.*

Application.—Place the initial end of the roller upon the outer side of the instep, and pass obliquely across the upper surface of the foot to the ball of the great toe; thence beneath the sole to the opposite side; then proceed with as many spiral reversed turns as will be necessary to carry the bandage well up in front of the instep, when a few circular sweeps are to be passed around the

Fig. 39.



malleoli and immediately above; after which, ascend the limb by the spiral reverses, Fig. 39.

Use.—This form of bandage has the same general use as the one just described and represented in Fig. 38. As it leaves the heel and toes well exposed, it is, on this account, principally employed in the application of the *Dextrine* or *Starch Bandage*.

5. *The Crossed, or Figure of 8 Bandage,*

Is one of the neatest and most useful bandages employed by the surgeon, deriving its name from its shape. It is particularly applicable in covering joints or other parts requiring a firm and perfectly uniform pressure. Either the single or double-headed roller may be used. It is divided into several kinds, including the *Spica*, each of which will be treated of under the following head:

VARIETIES OF THE CROSSED, OR FIGURE OF 8.

1. *The Crossed of One Eye*

Requires a roller five yards long by two inches in width.

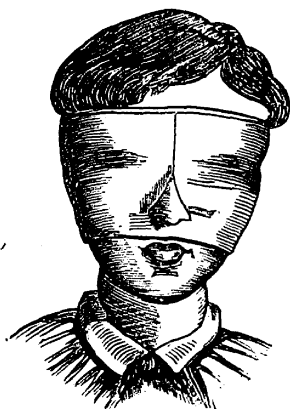
Application.—If the hair be long or very abundant, place a closely-fitting cap of muslin, or of a similar material, on the head previous to the application of the bandage, to prevent the roller from slipping. If for the right eye, pass from right to left around

the forehead and nape of the neck by circular turns; provided it be for the left eye, pass in the opposite direction. On reaching the nape of the neck the third time, carry the roller under the ear of the affected side, and obliquely over the jaw and eye, covering the root of the nose, without carrying the band low enough to interfere with the vision of the sound eye; thence across the temple to the occiput, making the necessary number of similar turns to fulfil the object of the bandage, terminating it by circular sweeps around the forehead, Fig. 40.

Fig. 40.



Fig. 41.



Use. — Simply to retain dressings; or, if desirable, to make pressure.

2. *The Crossed of Both Eyes.*

This bandage may be made with a double or single-headed roller, seven yards long by two inches wide.

Application — Make two or three circular turns around the forehead and occiput by passing from right to left, or *vice versa*, on reaching the back of the head, pass under the ear up over the eye, root of the nose, and the parietal protuberance to the neck again; at the third turn pass from the parietal protuberance to the temple, instead of round the occiput; then cross the root of the nose, the eye and the cheek, making a X with the turns first made; continue with a sufficient number of similar turns, terminating by circular ones.

Use.—It is employed as a retaining bandage. Pressure can be secured by a much more simple bandage, which consists of compresses and a broad piece of linen passed around the eyes, reaching to the middle of the forehead above, and terminating below just above the margin of the upper lip, and having an opening large enough to admit the nose, Fig. 41.

3. *The Crossed of the Angle of the Jaw*

Requires a roller 5 yards long by 2 inches wide, and a compress.

Application.—Secure the end of the bandage by circular turns around the cranium, passing from right to left, if the left side be affected; the reverse, if the injury or disease be upon the right. From the occiput pass the roller under and behind the ear of the sound side; under the jaw to the angle of the jaw on the affected side, placing a compress on and immediately behind this angle. Now carry the roller over the compress and the side of the face in front of the ear, obliquely over the vertex, behind the ear opposite the affected side. Make several turns in like manner, reversing the last in order to terminate the bandage by passing horizontally around the head.

Fig. 42.



Fig. 43.



Use.—It is sometimes employed to retain dressings in the parotid region; but its principal use is in the treatment of fracture of the neck and angle of the jaw, being the most efficient bandage used in cases of this character, as it forces the angle forward and inward to the anterior fragment by counteracting the action of the pterygoid

muscles. In the application of this bandage in the treatment of fracture, omit the circular turns, sometimes recommended around the neck and chin, as they are of no benefit, but rather tend to displace the fragments.

4. *Barton's Bandage for the Jaw.*

A roller five yards long by two inches wide is required.

Application.—Place the initial extremity of the roller on the occiput immediately below its protuberance, and carry the cylinder obliquely over the center of the parietal bone to the top of the head; thence descend across the right temple and zygomatic arch, passing beneath the chin to the zygoma of the left side; from this point proceed to the occiput again by traversing obliquely the zygoma, the temple, the summit of the cranium, and the right parietal bone. Now conduct the roller to the left, winding around the base of the jaw, to return to the occiput; repeat

this same course until the roller is spent, placing a pin at the vertex and at other points where the bandage crosses itself, as represented in Figs. 43 and 44.



Fig. 44.



Fig. 45.

Use.—It is employed in the treatment of fractures of the lower jaw, anterior to the angle. This is eminently the most simple, easily applied and useful bandage that has been invented for this purpose.

5. *Professor Gibson's Bandage,*

Though not exactly a figure of 8, is similar to the above, and may be described here. It consists of a roller five yards long by an inch and a half or two inches wide, with suitable compresses.

Application.—A piece of pasteboard having previously been softened by immersion in hot water, and molded to the form of the chin and jaw, as seen in Fig. 45, is first applied upon the seat of fracture. The middle portion of the bandage being placed upon the chin over the splint, then, placing a linen compress of suitable thickness under the chin, confine it by passing the roller several times perpendicularly over the side of the face, the zygoma, and summit of the head, and thence beneath the jaw; changing the course of the bandage at the temple, encircle the occiput and forehead by horizontal turns; a few horizontal turns are also to extend around the nape of the neck, along the ramus of the jaw, over the point of the chin. To render the whole more secure, a short strip may be fastened to the horizontal turns, encircling the forehead, extending to the lower horizontal turns, Fig. 45.

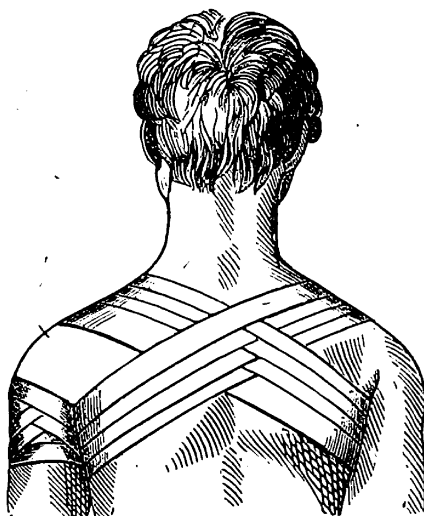
Use.—Fractures of the inferior maxilla.

6. *The Posterior Figure of 8 of the Chest*

Requires a roller seven yards long by three inches wide.

Application.—Having the anterior edge of the axillæ well protected by compresses or cotton, in order to prevent them from becoming chafed, direct an assistant to draw the patient's shoulders well back, and commence the initial end of the roller at the superior part of the left arm, by making three or four spiral reversed turns from before backward, and from within outward. From the front of this shoulder, pass obliquely over the back to the right axilla; thence in front of the shoulder over the back to the axilla of the left side again; continue to make similar turns so long as the roller will permit, fastening its terminal end by one or two circular sweeps around the body or arm, Fig. 46.

Fig. 46.



Use.—Formerly it was the principal bandage used in the treatment of fractured clavicle; but more modern ingenuity has devised means better adapted to the treating of this injury, and hence it is little employed for this purpose at present. It may be of service in uniting wounds of the back, or in preventing contractions from burns, or other causes, on the front of the chest.

7. *The Anterior Figure of 8 of the Chest*

Requires a roller of the same dimensions as the above.

Application.—This bandage is applied the same as the one just described, with the exception of the turns crossing each other on the breast instead of the back.

Use.—To unite longitudinal wounds of the breast, in dislocation, anteriorly, of the sternal end of the clavicle, when compresses should be placed on the upper part of the sternum; and in severe burns on the back, when deformity is threatened by the contraction of the cicatrices.

8. *Spica of the Shoulder*

Should be eight yards long by two and a half inches wide.

Application.—Leaving about two feet of the initial end of the

roller free, commence by making one or more spiral reversed turns around the superior part of the arm of the injured side, passing from without inward, and from before backward. Then pass behind the arm over the shoulder, obliquely downward across the front of the chest to the axilla of the sound side; thence around the back, obliquely upward over the shoulder and down in front, passing under the axilla of the affected side. Continue to make similar turns, covering one-third of each preceding one. The axilla must be well supplied with suitable compresses or cotton. After securing the terminal end of the bandage, bring the initial portion, which was left free, over the anterior folds of the axilla and the shoulder around the back of the neck, to terminate in front of the chest on the sound side, Fig. 47. When this bandage is made to ascend from the point of the shoulder toward the neck, it is called the *Spica Ascendens*; if from the neck to the shoulder, *Spica Descendens*.

Fig. 47.



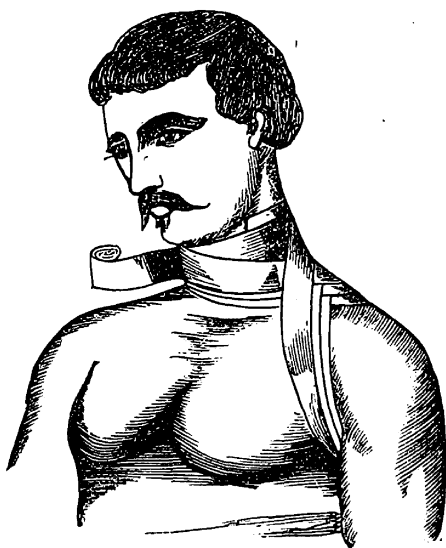
Use.—To make compression around the extremity of the shoulder, and in the treatment of dislocation of the humeral end of the clavicle.

9. *Figure of 8 of the Neck and Axilla.*

The roller should be five yards in length by two inches wide.

Application.—Directing the roller from before backward, and from left to right, secure the end by one or two circular turns around the neck; reaching the base of the left side, pass over and behind the shoulder, under the axilla; thence in front to the root of the neck on the same side; round the neck to the left side again, to make the subsequent turns in like manner, Fig. 48.

Fig. 48.



Use.—This is a very serviceable bandage in retaining dressings about the shoulder, or in the axilla. It must, however, be applied with care, that it may not press too firmly, thus interrupting circulation or causing cramps in the hand.

10. *Figure of 8 of One Breast*

Requires a roller eight yards long by two and a half inches wide.

Application.—It may be applied by confining the initial extremity of the roller at the waist; reaching the left side of the body,

or the right, as the case may be; direct the roller obliquely across

Fig. 49.



the front of the chest, over the shoulder of the sound side; thence obliquely downward across the back, to make a horizontal sweep around the waist, as represented in Fig. 49. Continue with similar turns until the bandage is exhausted. It is preferable, however, to apply it as follows: Place the initial end of the roller behind the shoulder of the affected side; pass obliquely across the back, over the root of the neck on the opposite side; thence obliquely downward in front of the chest, passing beneath the injured breast and under the axilla, to

the point of starting. Make similar turns to fasten the roller; then, on reaching the axilla of the side affected the third time, proceed with a horizontal sweep around the trunk, to the place of starting; thence over the shoulder again, and so on till the bandage is complete.

- *Use.*—It is employed as a retaining bandage, and to afford support to the mamma in cases of cancer or injury.

11. *Figure of 8 of both Breasts.*

A roller from twelve to fifteen yards in length by two and a half inches in width is required.

If the object be to approximate the shoulders to the sternum alone, the folds of the bandage should cross in front of the chest and above the mammæ; but if it be to give support to the gravid breasts previous to or during the period of lactation, the roller should be applied as follows:

Application.—Place the initial extremity of the roller behind the right axilla; from which point continue across the back; carry

the cylinder over the left shoulder, and pass obliquely beneath the right mamma, to the place of starting. Gradually ascend by two or three succeeding turns, made in like manner, and then pass transversely across the back to the left axilla; thence across the chest, under the left mamma, to the right side of the neck, and thence to the left axilla again. Make two or more similar turns, and on reaching the axilla continue horizontally around the trunk, allowing the sweeps of the roller to cover the breasts from below upward. Terminate the bandage by an additional turn around the neck and axillæ, Fig. 50.

Fig. 50.



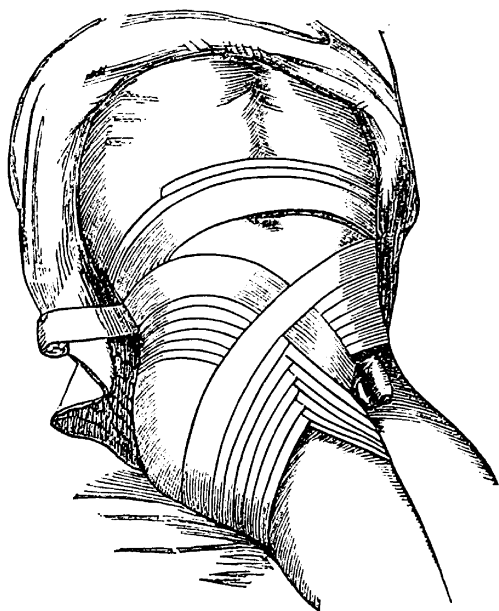
Use.—This bandage may also be employed to retain dressings, but is particularly useful in giving support to pendulous mammae during the period of lactation.

12. *Spica of the Groin.*

This bandage requires a roller eight or ten yards long by three inches wide.

Application.—Confine the initial end of the roller above the iliac crests by making two or three horizontal turns around the abdomen, passing from right to left if for the right groin, and *vice versa* if for the left. From the iliac crest descend to the inner side of the thigh, as far down as the bandage is to extend; next, carry the cylinder completely around the thigh, to cross the first turn very nearly in front; thence to the opposite side, passing transversely across the back, to continue with the necessary number of similar turns. Terminate the roller by a circular sweep. Thus applied, the bandage constitutes a *Spica Ascendens*, Fig. 51. If the *Spica Descendens* be desired, it is readily made by passing the first turn high in the groin instead of the last one.

Fig. 51.



Use.—To retain dressings, and to make compression. Is useful after operations for strangulated hernia, where compression is required.

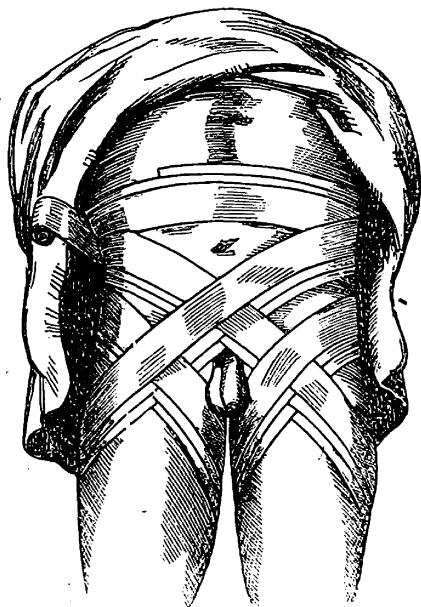
13. *Spica of Both Groins.*

It is formed of a roller twelve yards long by two and a half inches wide.

Application.—After securing the initial end of the roller as previously directed, by passing from right to left and from before backward, conduct the cylinder obliquely downward from the right iliac crest to the outer side of the left thigh; which being encircled, pass around the back of the pelvis to the right groin, from which point descend to the inner side of the corresponding thigh; carry the roller completely around it, and thence obliquely upward across the pelvis to the left side; passing transversely along the back to the right ilium, pursue a similar course, terminating the bandage by a circular turn, Fig. 52.

Fig. 52.

Fig. 52.



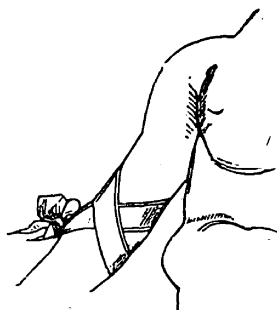
Use.—To make compression and to retain dressings.

14. *Figure of 8 of the Elbow*

Requires a roller two yards long by two inches wide.

Application.—Confine the free extremity of the roller at the

Fig. 53.



upper part of the forearm; on reaching its radial side, conduct the head of the roller obliquely across the bend of the elbow to the internal condyle of the humerus; thence above the olecranon to the external condyle; from this point form an X in front of the joint by crossing the first turn obliquely, and pass around the forearm to continue the course just described, Fig. 53. If the arm be much flexed, make one circular sweep around the point of the elbow after completing the

second figure of 8.

Use.—Is employed to cover the elbow-joint, and is therefore used in connection with the Spiral of the Upper Extremity, as the joint can not be neatly covered with the simple reversed turns.

15. *Figure of 8 of the Wrist.*

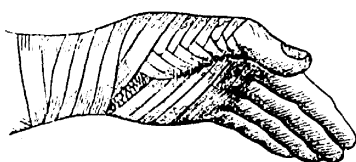
Application.—Secure the end of the roller by circular turns around the wrist; on reaching the ulnar margin the second time, pass obliquely across the hand to the space between the thumb and forefinger; thence transversely to the metacarpal bone of the little finger; from this point pass to the radial side of the wrist, and thence to the ulnar margin, to continue the same course.

Use.—To compress or retain dressings to the wrist-joint. It is sometimes added to complete the Spiral of the Upper Extremity.

16. *Spica of the Thumb.*

This bandage comprises a roller three yards long by about one inch wide.

Fig. 54.



hand being prone, or nearly so, Fig. 54. Make the subsequent turns in like manner.

Use.—To make pressure on the base of the thumb, and is very effective in keeping the phalanx of the thumb in position after dislocation.

17. *Figure of 8 of Both Thighs.*

Application.—A few turns of the roller, which should be about two and a half inches wide, in the simple figure of 8, is all that is required to make a proper application of this bandage.

Use.—To prevent movement of the thighs, as after the operation of lithotomy, or after the reduction of a luxation of the femur.

18. *Figure of 8 of the Knee.*

Application.—Secure the free end of the roller by circular turns around the superior part of the leg; on reaching the head of the fibula, pass obliquely over the patella to the internal condyle; thence transversely to the external one; from this point, cross the patella obliquely downward, forming a X with the first turn. Continue in a similar course till the knee is completely covered.

Use.—To afford pressure on the joint. It can also be employed to retain dressings in the popliteal space, or in treating fracture of the patella, or hydrops articuli, by reversing the turns of the bandage, by which the roller is made to pass from within outward, and from the extremity of the fibula across the back of the knee to the internal condyle; thence to the opposite side, onward to the head of the tibia, to regain the place of starting.

19. *Spica of the Instep*

Requires a roller seven yards long by two inches wide.

Application.—Start the roller from the tarsal extremity of the metatarsal bone of the little toe of the right foot; pass obliquely across the top of the foot to the base of the first phalanx of the great toe; thence transversely beneath the sole to the first joint of the little toe; now make two spiral turns over the front of the foot to reach the instep; from which conduct the cylinder over the point of the heel, permitting the roller to project a little beneath the sole; keeping parallel to the latter, cross the instep with turns which shall embrace the heel, forming the spica as high as desired, Fig. 55. If for the left foot, commence by placing the initial end of the roller on the tarsal extremity of the metatarsal bone of the great toe; thence pass obliquely across the front of the foot to the base of the little toe, and continue with turns similar to those just described, terminating the bandage by circular turns above the ankle.

Fig. 55.



Use.—This is a very serviceable bandage in making firm pressure of the instep or ankle, as is sometimes required in wounds of the

tibial arteries occurring at this point; also, in cases of sprain of the ankle, etc. We are indebted to the ingenuity of M. Rabbail for this bandage, who was the first to describe and recommend it.

RECURRENT BANDAGES

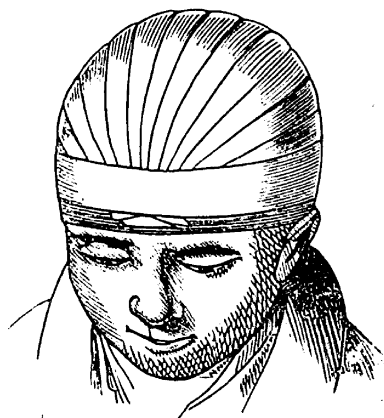
Are applied by peculiar turns, which make a sort of a cap for the parts they are designed to cover. Being easily deranged and difficult to make compression with on the vault of the cranium, oppressive to the forehead and temples, by the many circular turns, they are little used at the present day, and are in consequence almost entirely superseded by more approved dressings. A double or single-headed roller may be employed in their application, though the latter is preferable.

1. *Recurrent of the Head.*

This bandage is composed of a single-headed roller, five yards long by two inches wide.

Application.—Make two or three horizontal turns around the lower part of the forehead and occiput, in order to fix the free end

Fig. 56.



of the roller. On reaching the middle of the forehead, make a reverse at right angles with the circular turns, directing the head of the roller over the summit of the cranium to the occipital protuberance. A similar reverse must be made at this point in order to reach the forehead again. Continue in like manner with the subsequent turns, allowing each one to cover in one-third of the preceding. The opposite side can be covered by similar turns,

if desired, Fig. 56.

Use.—To retain dressings to the head. If this bandage be used, great care must be exercised lest serious results follow, such as ulceration or gangrene, in consequence of the turns being drawn too tight.

2. Recurrent of the Head.

Application.—Fig. 57 represents the bandage as applied in the use of the double-headed roller. Placing the body of the band on the forehead, *a*, make two or three circular turns; then reflect one head of the roller, *b*, over the vertex, while the other is continued transversely around the head, to hold it in position. Covering one side of the cranium by passing one head of the bandage backward and then forward, the other side may be dressed in like manner.

Use.—Same as the former.

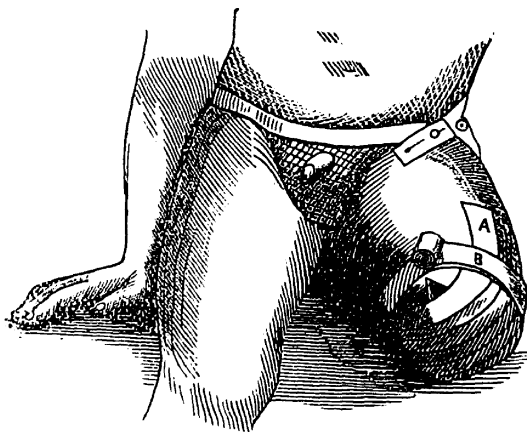
Fig. 57.



3. Recurrent of Amputations.

Application.—Having the stump well supported and the integuments pushed over the end of the bone, proceed to arrange the dressings properly; after which place the initial end of the roller on the limb three or four inches above the extremity of the stump, and secure it by two or three circular turns; on reaching the middle of the under portion of the limb, reverse the roller in order to conduct it over the end of the stump to the upper surface, *A*, about four inches above the extremity, Fig. 58. Hold the reverses with the fingers of

Fig. 58.



the left hand till the entire face of the stump is covered; then secure them by spiral reversed turns, commencing at B, and continue two or three inches above the part of the bandage first applied. Care must be taken not to apply any portion of the bandage too tight, for fear of producing irritation and spasms.

(The application of a suspensory bandage to the testicles is also shown in the cut.)

Use.—To retain dressings, and to afford protection to the stump.

SECTION III.

THE COMPOUND BANDAGE

Consists of two or more bands, united so as to form a somewhat complicated means of retaining dressings. Their construction is sometimes quite as difficult as their application; hence, pains should be taken to have them properly arranged, that they may adapt themselves perfectly to the part they are intended to cover.

VARIETIES OF THE COMPOUND BANDAGE

Include the T and the Invaginated Bandages, as well as Slings, Suspensories, Sheaths, and Laced Bandages; receiving their name either from their peculiar form, use, part to be covered, or manner of application.

§ 1.—The T-Bandages.

1. *Single T, or Crucial Bandage.*

Composition.—It consists of two pieces—one horizontal, the other perpendicular—united in the form of a T, Fig. 59. The vertical piece should be about one-half the length of the horizontal portion, and fastened firmly to its middle. Sometimes two vertical pieces are used instead of one, forming the Double-T; or, what is very nearly the same thing, the single tail is slit into two parts to within a short distance of the transverse band, Fig. 60. The special application and use of this bandage will be described in the consideration of its several kinds.

Fig. 59.

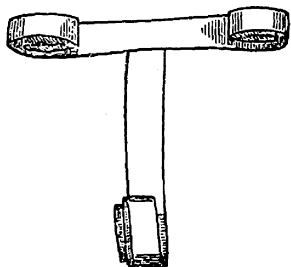
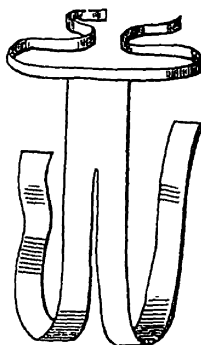


Fig. 60.



2. T-Bandage of the Head.

Composition.—Employ a horizontal portion two yards long by two inches wide; upon which, at a point about two feet from one extremity, stitch a vertical strip at right angles, the latter being one-half yard long by two inches in length.

Application.—Having the bandage rolled into two heads, place it upon the forehead so that the vertical portion may pass over the summit of the cranium to hang down the neck; after making one revolution around the forehead and occiput to secure the vertical strip, then reflect the latter over the vertex to the forehead, and continue the horizontal turns until the bandage is exhausted, Fig. 61.

Fig. 61.

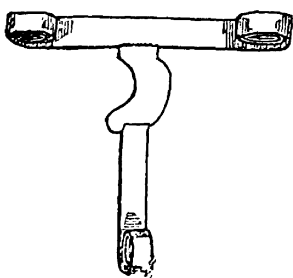


Use.—This is used as a light retaining bandage, as the vertical portion can be made to pass over the cranium in any other direction. It is preferable to the recurrent bandage.

3. T-Bandage of the Ear.

Composition.—A horizontal portion two yards long, a vertical band one-half yard long, and a piece of linen to cover the ear; or, if the dressing is to be applied either behind or in front of the ear, use a piece with a slit in it sufficiently large to permit the ear to pass through, Fig. 62. Sew one end of the piece of linen

Fig. 62.



to the middle of the horizontal band, and to the other end attach the superior extremity of the vertical band.

Application.—Place the circular band on the head above the ear of the affected side, and pass the linen over the part to be covered, continuing the vertical portion under the jaw and up on the opposite side, where it will be confined by the horizontal sweeps of the transverse band, Fig. 63. This,

the most simple bandage applied to the ear, is, nevertheless, but little employed; temporary bandages, or what is better, a simple cravat, fastened on the top of the head, having been substituted for it.

Use.—To retain dressings on or in the vicinity of the ear.

Fig. 63.



4. *Double-T of the Nose.*

Composition.—One band two yards long by one inch wide, and two bands one yard long by the same width; the latter to be fastened to the first at right angles, being one inch apart.

Application.—Placing the middle of the horizontal band on the upper lip, conduct the extremities transversely across the cheeks, under the ears, to the nape of the neck, where they are to be tied in a bow-knot. Then crossing the vertical bands at the root of the nose, conduct them obliquely over the summit of the head to the occiput; inserting them under the roller first applied, continue their course around the head, passing immediately behind the ears, and confine their extremities by additional turns of the horizontal band, fastening them securely by the use of pins, Fig. 64.

Fig. 64.



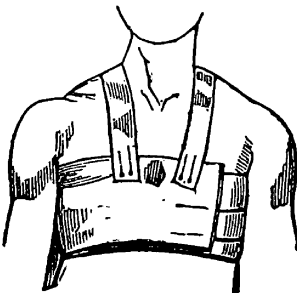
Use.—A retaining bandage for the upper lip and root of the nose, particularly in cases of fracture of the latter.

5. *Double-T of the Chest.*

Composition.—A broad piece of muslin suited to the size of the patient, and a band of about two feet in length, split into two tails and fastened to the upper edge of the horizontal piece.

Fig. 65.

Application.—Pass the muslin around the chest and make it firm by stitches, or by the use of pins carefully applied. Then pass the bands over the shoulders to fasten them in front, Fig. 65.



Use.—To effect compression in fracture of the ribs, or to retain dressings on the back.

6. *Double-T of the Abdomen.*

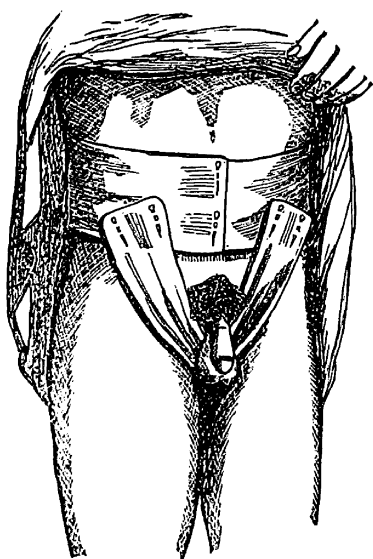
Composition.—Consists of a wide piece of muslin, to the lower border of which are attached two narrow bands half a yard long,

and which should be sufficiently wide apart to very nearly correspond with the great trochanters.

Application.—Encircling the abdomen and pelvis by a turn of the muslin, conduct the bands obliquely beneath the perinæum, under which they are to cross each other, and fasten near the crest of the ilium, as represented in Fig. 66.

Use.—To retain dressings, and to make compression after the operation of paracentesis, or after delivery.

Fig. 66.



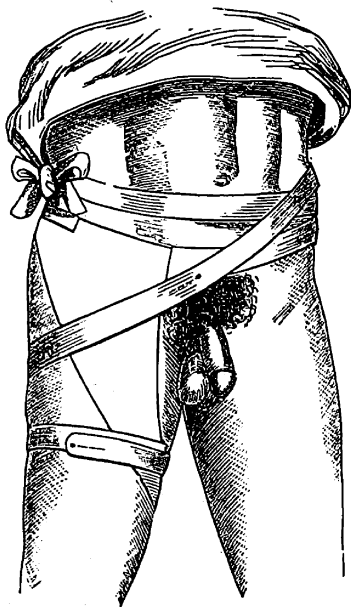
7. *Triangular, or Compound T of the Groin.*

Composition.—A triangular piece of muslin five inches wide at the base and ten inches long; to the base is sewed a band two yards in length, and to the apex another, three-quarters of a yard long.

Application.—Place the triangle on the groin with its apex pointing downward; pass the superior band around the waist, tying it in front. Now carry the triangular portion and the vertical band down between the thigh and scrotum, nearer the latter than is represented in the accompanying cut; continuing the band over the outside of the thigh, to be attached to the

transverse portion. If, however, the patient be able to move about, the vertical band may be made two yards in length, and caused to pass from the outer aspect of the thigh obliquely across the front of the pelvis, behind the back, to terminate by a turn around the thigh at the apex of the bandage, Fig. 67.

Fig. 67.



Use.—To retain dressings upon the groin in the treatment of buboes, or after operating for hernia; and for this purpose it is the most convenient and serviceable bandage used.

8. *Double-T Bandage of the Buttock.*

Composition.—A roller two yards long and three inches wide, and two vertical bands, each three-quarters of a yard long and two inches in width, stitched to the former at the proper distance apart and at about one-quarter its length from one extremity, Fig. 68.

Application.—Place the horizontal band on the back of the pelvis, so that the vertical strips may be conveniently and smoothly carried under the perinæum, to fasten to the horizontal band in front.

Fig. 68.

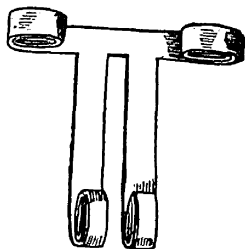
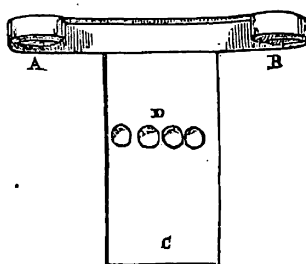


Fig. 69.



Use.—Employed to retain dressings for the perinæum, anus, or vagina, in cases of piles, prolapsus ani, and fistula.

9. *Perforated T-Bandage of the Hand.*

Composition.—A roller one yard long by two inches broad, and a piece of muslin twice the length and once the breadth of the hand. Fold the muslin on itself lengthwise, and cut four circular openings, D, in it, to correspond with the fingers. Then sew one of its extremities at right angles to the roller, A B, Fig. 69.

Application.—Pass the fingers through the openings, and draw the end of the muslin C, over the back or palm of the hand, fastening the free end by circular turns of the roller.

Use.—This bandage and the one next to be described afford most excellent substitutes for the gauntlet or demi-gauntlet. It is very easily applied, and forms a light retaining bandage for dressings applied either to the back or palm of the hand, or to the interdigital spaces.

10. *T-Bandage of the Hand.*

Composition.—Two strips of bandage, each a yard long by one inch wide, one of which is sewed to the other in the form of a T.

Application.—Place the horizontal portion of the bandage on the back or front of the wrist, according to which side of the hand the dressing is to be retained; carry the vertical roller over the interdigital space of the first and middle finger, to reach the wrist again, where it is secured by a revolution of the transverse band; reflect the vertical piece over the second interdigital space, and so on till the bandage be complete.

Use.—To retain dressings to the hand, and may be used in preference to the gauntlet or demi-gauntlet.

THE INVAGINATED BANDAGES

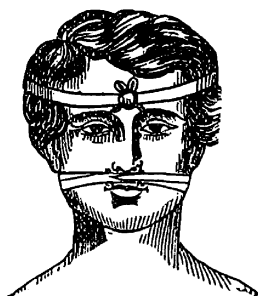
Are of two kinds, according as they are prepared from one or two rollers. In one instance, the roller is torn into strips or tails at one extremity, while there are slits or button-holes made near the other, through which the tails are designed to pass; in the other instance, two separate bands are employed. By their action as compresses they are very efficient in neatly approximating wounded surfaces. The first, or that made with one roller, is more applicable to the treatment of longitudinal wounds; whereas, the second is employed in those which are transverse, and also in certain forms of fracture. In general, this kind of bandage will be found particularly useful in deep-seated wounds, especially in cases where the parts below can not readily be kept in apposition, thus favoring the formation of pus.

1. *Invaginated Bandage for Vertical Wounds of the Lip.*

Composition.—A roller from two to three yards long by one inch wide, rolled into two heads, and two compresses two inches square, which are placed on the cheeks near the angle of the mouth.

Application.—Place the body of the roller on the forehead; conduct the cylinders around the head to the occiput; from which pass immediately below the ears, over the compresses, to the injured lip, where one roller is made to pass through an opening in the other, when both are continued round the head again. Continue this course until the parts are properly supported, terminating the bandage on the forehead, Fig. 70.

Fig. 70.



Use.—In vertical wounds of the lip, to support hare-lip suture; and may be used in hemorrhage of the coronary arteries.

2. *Invaginated Bandage of the Body.*

Composition.—A double-headed roller long enough to encircle the body several times, and two compresses the length of the wound.

Application.—Place the body of the bandage on the back, carrying the heads under the axillæ, over the compresses and wound; one band being made to pass through a slit in the other. Draw the rollers sufficiently tight to coaptate the sides of the wound properly, and continue as many revolutions around the body as required.

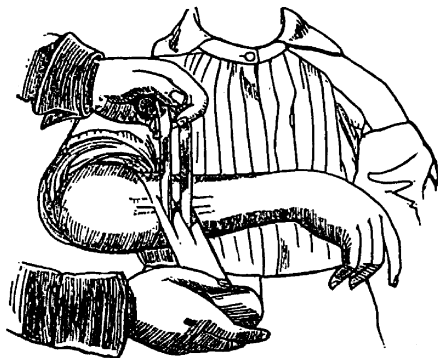
Use.—In longitudinal wounds of the chest or abdomen.

3. *Invaginated Bandage for Longitudinal Wounds of the Extremities.*

Composition.—A piece of linen sufficiently long to make several turns around the part, and as wide as the wound is long; tear one extremity into three tails, of a length to embrace three-fourths of the limb. After making three openings through which the tails are made to pass, roll up the remaining portion of the band in order to apply it more conveniently. Two graduated compresses are also required.

Application.—If the limb be tapering at the part to be dressed, a few turns of a spiral bandage must be first applied at the lower portion to prevent the second bandages and compresses from slipping. Then apply that part of the bandage situated between the tails and slits on the limb directly opposite the wound, with the graduated compresses on either side of the latter; pass the tails through the corresponding openings, and make sufficient traction to coaptate the lips of the wound. Secure the tails by turns of the remaining portion of the roller, Fig. 71.

Fig. 71.



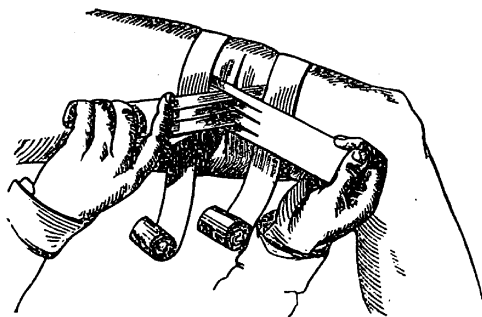
Use.—In deep-seated wounds of the extremities. Adhesive strips may also be used at the same time.

4. *Invaginated Bandages for Transverse Wounds of the Extremities.*

Composition.—An ordinary roller, together with two strips of muslin corresponding in width with the length of the wound, and having three tails in the extremity of one, and three slits near the middle of the other.

Application. — Place the piece having the slits in it upon the limb immediately below the wound, so that the openings will correspond with its lower lip; fasten the inferior extremity of this piece by circular turns of the roller; now fasten the piece with the tails above the upper edge of the wound in a similar manner; place a compress above and below; then draw the tails through the openings with sufficient traction to approximate neatly the edges of the wound, Fig. 72.

Fig. 72.

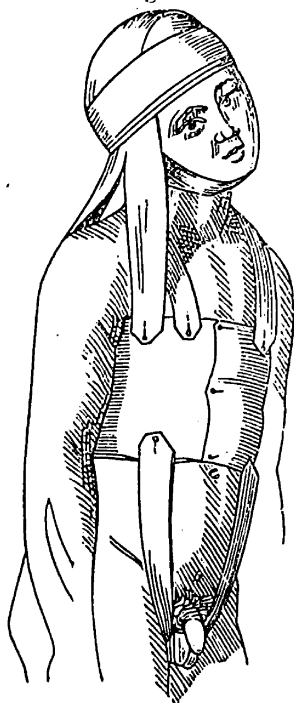


Use. — Transverse wounds of the extremities and fracture of the patella.

5. *Uniting Bandage for Transverse Wounds of the Neck.*

Composition.—A single-headed roller four yards long by two and a half inches wide; a piece of muslin one and a half yards long by three inches wide; a bandage for the chest with perineal bands and shoulder strips.

Fig. 73.



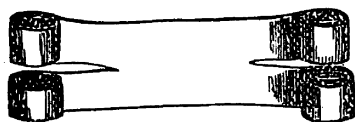
Application.—Fasten the bandage about the chest; then pass the muslin over the summit of the head and secure it by circular turns of the roller; pin the free extremities of the muslin to the bandage encircling the thorax, previously inclining the head so as to meet the requirements of the case. Complete the dressing by applying the perineal and shoulder bands, Fig. 73. (In the cut the muslin is represented as being attached to a closely-fitting cap, which is fastened to the head by a band passing under the chin.)

Use.—In transverse wounds of the neck, as of those occasioned by attempts at suicide, and in severe burns, to prevent deformity by the contraction of the cicatrices.

SLINGS.

Slings are formed of pieces of muslin of different lengths and

Fig. 74.



widths, to suit the circumstances of the case; and are split into two or more tails at each extremity, Fig. 74. They are sometimes made, also, by attaching bands to the muslin, the latter remaining whole—thus giving it a resemblance to slings employed for hurling stones, whence their name.

1. *Six-tailed Sling, or the Head Bandage of Galen.*

Composition.—A piece of muslin one yard long by a quarter of a yard wide, split into three tails at each extremity to within about three inches of the middle, the central part being the widest.

Fig. 75.



Application.—Place the body of the sling on the top of the head, carrying the central tails underneath the chin. Direct the anterior strips to the posterior part of the head, and secure them by bringing the two remaining tails forward to the forehead, where they may be fastened with pins.

Use.—To retain dressings.

2. *Four-tailed Sling of the Head.*

Composition.—A band of muslin a yard long by six inches broad, torn at each extremity into two tails extending to within three inches of the middle.

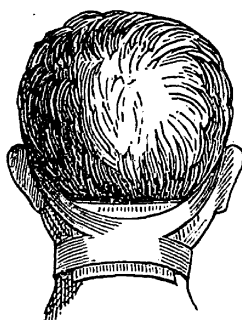
Application.—When it is to be applied to the forehead, place the body of the sling on the wound and carry the frontal tails to the occiput, where they are to be fastened; then pass the posterior tails under the chin, Fig. 76. If it be required to confine dressings to the summit of the head, the posterior tails should be made to pass under the chin, and the anterior crossed on the occiput and then brought forward to fasten in front of the throat.

In applying it to the *nape of the neck*, the upper tails are to be carried over the forehead, crossed, and fastened at the occiput. Pass the lower tails in front of the neck, Fig. 77.

Fig. 76.



Fig. 77.



Use.—In wounds of the head and neck, as they can be readily applied to any portion of these parts by changing the direction of the tails.

3. *Sling of the Chin.*

Composition.—A piece of muslin six inches by four, slit into two tails at each extremity, the tails being two inches long and having a piece of tape or narrow band one yard long attached to the end of each one.

Fig. 78.



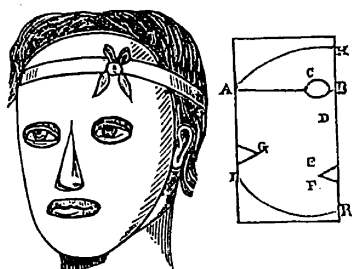
Application.—Place the body of the sling so that the chin may rest directly in the center; then carry the upper tails backward beneath the ears to the nape of the neck, where they should cross; thence to the forehead, fastening them in the use of pins, or by a knot. The two posterior or under tails are then to be carried upward in front of the ears to cross at the vertex, each being continued onward in the same line until it reaches the point of crossing of the upper and lower tails, where it should be secured by a pin. The cut, Fig. 78, represents it as terminating a little above.

Use.—In fracture of the inferior maxilla without displacement, and to retain dressings to the chin or lower part of the jaw in case of other injuries.

4. *Sling of the Face, or Mask.*

Composition.—A piece of muslin or silk about ten inches square, and four bands with which to hold it in position. In preparing the piece for the face, fold it upon itself through the middle; now place this folded edge so that it will exactly correspond with the mesial line of the face, and draw the line, A B, and a circular line, C, to indicate the openings for the eyes, Fig. 79. Draw a semi-circular, F, for the mouth; also a small transverse line, E, to correspond with the end of the nose. Then cut off the angles, A H and I K, to give an oval form, and cut out a triangular piece at G from each of the free edges; the lips of the opening thus made to be sewed together, so that it may be adapted to the prominence of the cheek-bones. Attach two vertical tails at I, and two horizontal ones at A; now open it and make a vertical incision, D, from the line, E, up to the point between the eyes, to admit the nose.

Fig. 79.



Application.—Applying the body-piece to the face, carry the tails attached at A around the side of the head to the occiput, cross them, and pass to the forehead. The horizontal tails are to be passed backward and crossed on the nape of the neck, and thence to the forehead or chin.

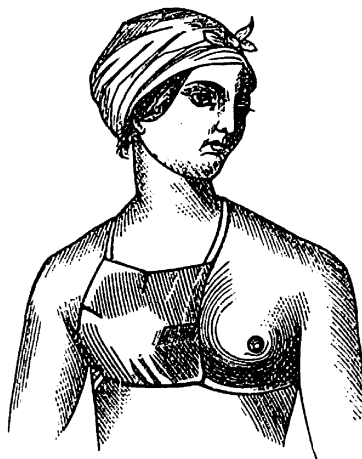
Use.—To retain dressings to the face in cases of burns, wounds, small-pox, etc.

5. *Sling of the Mamma.*

Composition.—A square piece of muslin sufficiently large to cover in the breast, having on each side an incision one inch and a half deep; and having, also, four bands long enough to reach around the chest, sewed to its angles.

Application.—Having the mamma supported, place the body of

Fig. 80.



the sling on the part, and direct the lower tails under the axillæ. Conduct the upper tails over the shoulders down to the horizontal band, where they are to be fastened, Fig. 80.

Use.—To retain dressings to the breast, or to afford support in cases of cancer, etc. It may sometimes be used in preference to the **Four-tailed Sling** in confining dressings to the point of the shoulder, the elbow, wrist, heel, or instep, it being necessary only in the application to pass the tails around the part in such a manner

as to secure the bandage firmly.

SUSPENSORIES

Are bags of various sizes, employed to support depending parts and to retain dressings to parts upon which it is not convenient to apply a bandage.

1. *Suspensory of the Nose.*

Composition.—It is prepared by folding a square piece of muslin through its middle, and then cutting it into the form of a triangle by making an incision through the lines B C and C D, Fig. 81; making, also, an opening at A to correspond with the nostril. A vertical and a horizontal band are then to be attached to its edges.

Application.—Place the nose within the suspensory, carrying the vertical band over the summit of the head to the neck, where it should be secured by the horizontal bands, which are made to cross on the occiput, and to pass from thence to the forehead, where they are to be fastened, Fig. 82.

Fig. 81.

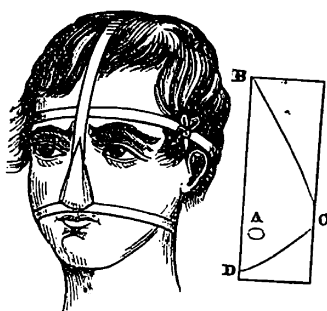
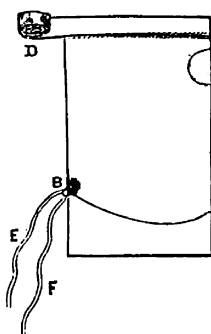


Fig. 82.



Use.—To confine dressings to the nose.

2. *Suspensory of the Scrotum.*

Composition.—Having a piece of muslin of the proper size, say six inches by four, fold it upon itself lengthwise, and cut an opening, A, for the penis, and cut off the lower angles by making an incision in the line B C, Fig. 82. Sew the divided edges of the curved portion together; attach a horizontal band, D, to the upper part, and two vertical ones, E F, to the lower angles, making a buttonhole in the end of each strip; then sew two buttons on the transverse band to afford attachment for the perineal bands.

Application.—Pass the penis through the circular opening, A, envelop the scrotum completely, and carry the belt, D, around the back of the pelvis to return in front and fasten above the pubes. Direct the vertical straps beneath the perinæum, and along the inferior border of the glutei muscles over the hip, to button to the horizontal band in front. The ready-made suspensory bandage found in the shops is applied in the same manner, and, owing to its simplicity and usefulness, is to be highly recommended, Fig. 58.

Use.—In the treatment of swelled testicle, hydrocele, irreducible scrotal hernia, etc.

SHEATHS

Are coverings resembling the finger of a glove, and are designed to retain dressings to the penis, fingers, and toes. They are commonly known as “finger-stalls.” A most satisfactory use can be made of them in cases of gonorrhea, by their retaining a mass of

charpie on the head of the penis to absorb the discharge, and thus prevent the linen from becoming soiled. They are very convenient in this and other affections of that organ, as they are not readily deranged by erections. The band securing it should pass around the hips; or, if applied to the finger, around the wrist; if to the toes, around the ankle.

● LACED OR BUCKLED BANDAGES

Are made from some more or less elastic material, as buckskin, flannel, caoutchouc, knit woolen, or gum-elastic cloth, and are applied to surfaces requiring a constant and equable pressure. They are retained to the part by the use of straps and buckles, or cords passed through eyelet-holes, whence their name.

1. *Laced Bandage for the Knee.*

This bandage may be made of any of the materials named above, and should be made to order, as their utility depends almost entirely upon their fitting accurately. They are used in dislocations of the patella, and in chronic enlargements of the joints.

2. *Laced Stocking.*

If this can not be conveniently obtained ready-made, take a strongly-knit stocking and slit it down the side, and hem to each edge

Fig. 83.

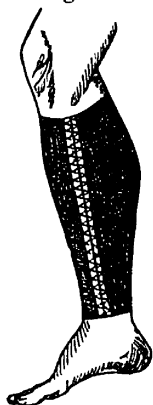


Fig. 84.



a thin strip of whalebone; then work a few eyelet-holes in order to lace it firmly, Fig. 83. It is employed in making pressure upon varicose veins, tender and extensive cicatrices of the leg, and in ulcers.

3. *Laced Gaiter, for the Foot.*

This is made of buckskin, cloth, or kid, and laces along the side of the ankle and foot. It is particularly useful in giving support to the part, in weakness of the lower portion of the leg or foot, occasioned by sprains, etc.; also, in old ulcers, and in œdematous swelling of this extremity, Fig. 84.

CHAPTER II.

THE HANDKERCHIEF SYSTEM OF M. MAYOR.

This system of bandaging, proposed by M. Mayor, of Lausanne, Switzerland, in 1838, has some very favorable features to recommend it, among which are the following, enumerated by this surgeon himself: "The handkerchief is found everywhere, and under every circumstance; is adapted to its purpose; is not liable to become relaxed or otherwise deranged, and can not become corded; it is easy to fasten; may be changed and reapplied with the utmost promptitude, as a single circumvolution of it is often equal to a multitude of turns of the common band; is also more economical as it may always be washed and applied to other than to surgical purposes; the thickness and breadth can be varied at will; in short, it is so much the more perfect as it forms one whole, while each turn of a common band, being considered as a piece apart, the derangement of one necessarily entails the derangement of all the rest."

He does not, however, recommend this variety of bandage to the entire exclusion of the common roller; for he observes: "There are cases which require a methodic compression of a certain energy, such as affections of the mammæ and of the extremities. But as these are comparatively rare, handkerchiefs should be employed as a general rule, while rollers should form but the exceptions."

Though I have made comparatively little use of this method, still I am disposed to regard it as possessed of some degree of merit,

and hence worthy the attention of surgeons. Without giving the system complete, however, as originally introduced, only the more important of its applications will be noticed.

PREPARATION OF THE BANDAGE.

The **Handkerchief** to be employed should consist of a square piece of linen, cotton, or silk, folded so as to constitute in form an *Oblong*, *Cravat-shaped*, *Triangular*, or *Cordiform* handkerchief; these four modifications comprehending the entire variety that will ordinarily be required.

The **Oblong Square**, Fig. 86, is formed by doubling the *square*, Fig. 85, once upon itself in the direction of the dotted line, *a b*.

Fig. 85.

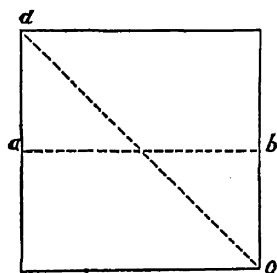


Fig. 86.

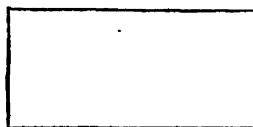
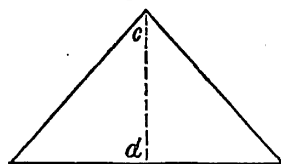


Fig. 88.



Fig. 87.



The **Cravat**, Fig. 88, requires very little explanation, being folded the same as those ordinarily worn about the neck. The body, *a*, is first applied to the part, and the whole secured by means of the ends, *b c*.

The **Triangle**, Fig. 87, like other modifications of the bandage, must correspond with the size of the part to be dressed. The largest size employed is about one yard in length and one-half yard from the apex, *c*, to the middle of the base, *d*. It can be made smaller by folding it upon itself in the direction of the line *c d*, or by cutting off strips from each side. In applying it, the base should

first be laid upon the surface, and then the extremities carried smoothly around the parts by making plaits or folds, if necessary. It is made by doubling the square handkerchief upon itself through one of its diagonals, as for example, in the line, *d c*.

The Cord is made by twisting the cravat, and may be used as a substitute for the tourniquet.

SECTION I.

THE HANDKERCHIEF AS APPLIED TO THE HEAD.

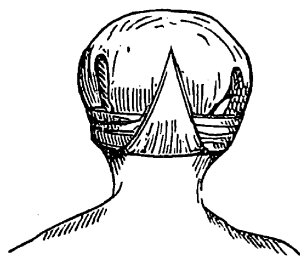
1. *Fronto-Occipital Triangle.*

Application.—Place the base of the triangle on the forehead, the apex passing over the arch of the cranium to the nape of the neck; carry the tails or angles transversely around the head, to cross at the occiput; at the same time covering in the apex, which should be reflected upward and fastened to the vertex, Fig. 90, subsequent to the securing of the angles on the forehead, Fig. 89.

Fig. 89.



Fig. 90.



Use.—A retaining bandage for dressings applied to the head.

2. *Fronto-Occipito Labialis Cravat.*

Application.—Place the body on the forehead; pass the tails horizontally backward to cross at the nucha; bring them forward to the affected lip, where one of the tails is to be passed through

an opening in the other; compresses being placed on each side of the wound, make the traction sufficient to bring the edges in apposition, fastening the ends of the cravat under the ears by means of pins or a few stitches. If a triangle handkerchief be used in preference to the above, the apex must be carried beneath the angles at their point of crossing, and then reflected to the vertex and fastened, Fig. 91.

Fig. 91.



Fig. 92.



Use.—To confine dressings in wounds of the lip, and to assist in the approximation of the edges of the opening after the hare-lip operation.

3. *Vertico-Mental Triangle.*

Application.—The body of the handkerchief being placed on the vertex, carry the extremities under the chin; and, by continuing them onward, they are made to fasten to the first turn near the ears. The apex can be brought obliquely forward to the side of the head, and pinned, Fig. 92.

Use.—A very convenient bandage for retaining dressings under the chin, or in the parotid region.

4. *Auriculo-Occipital Triangle.*

Application.—Place the base of the triangle in front of the affected ear, and carry one angle beneath the jaw, while the other

passes over the top of the head, the two meeting near the sound ear, where they may be tied; or, if greater firmness be desired, turn the angles once around each other, and then make a circular turn around the forehead and occiput, Fig. 93.

Fig. 93.



Use.—To retain dressings to one ear without injuring the other.

Many other applications of the cravat may be found useful in special cases. M. Mayor, and others following him, have proposed the employment of it for suspending the foot, for confining the hand to the upper arm, etc. As temporary expedients, such arrangements may answer very well, but they have the inconvenience of causing congestion and swelling of the parts below, since they constrict the limb circularly, and of course hinder the passage of venous blood.

SECTION II.

THE HANDKERCHIEF AS APPLIED TO THE TRUNK.

1. *Cervical Cravat.*

Application.—Place the body of the cravat on the front, side, or back of the neck, according to the requirements of the case, fastening the angles by pins or by a knot. As very little compression can be safely applied to the neck, this bandage will, ordinarily, prove the most convenient and serviceable.

Use.—A retaining bandage for dressings.

2. *The Dorsal-Thoracic Triangle.*

Application.—Place the base of the triangle upon the anterior or the posterior aspect of the chest, as the seat of the injury may require, and tie the tails upon the thorax either before or behind, while the apex is allowed to repose over one of the shoulders, being attached to the base of the triangle through the intermedium of a band, if it be not sufficiently long of itself to reach this point.

Use.—To retain dressings upon the anterior or posterior face of the chest.

3. *Simple Bis-Axillary Cravat.*

Application.—Place the body of the cravat in the axilla of the affected side; cross the ends very nearly at right angles in front of the corresponding shoulder, Fig. 94, and carry one of them obliquely in front of the chest to the sound side; the other over the root of the neck, behind the chest, and under the arm, to meet its fellow, when they are to be fastened by a knot, taking care to protect the sound axilla by means of a compress.

Use.—In retaining dressings to the axilla in the treatment of abscesses; in caries of the head of the humerus; in wounds, hemorrhage, etc.

Fig 94.



4. *Compound Bis-Axillary Cravat.*

Application.—The center of the cravat being placed on the axilla of the sound side, carry the tails—one in front, the other behind the chest—to the base of the neck at the opposite side, and tie their extremities; then apply a smaller cravat in the affected axilla, carrying one of its tails through the handkerchief first applied, so that the two may resemble somewhat the links of a chain, Fig. 95.

Use.—This bandage may be employed for the same purpose as the preceding; also, in fractures of the coracoid process of the scapula, and in retaining dressings to the stump after amputations of the shoulder-joint.

Fig. 95.



5. *Triangular Cap of the Breast.*

Application.—Place the base of the triangle, A B B, obliquely across the chest and under the mamma, directing one of the tails under the axilla of the affected side; the other over the base of the neck of the sound side; the apex, C, to be carried over the shoulder and fastened to the angles on the back, Fig. 96.

Fig. 96.

Use.—To retain dressings to the breast, or to afford it support during lactation, and after the operation of extirpating the gland. This bandage may be highly recommended, owing to the simplicity of its application, the facility with which it can be retained in position, and its perfect adaptation to the object to be accomplished. In cases of mammary abscess, and in heavy, pendulous breasts, it is exceedingly useful.



6. *Single Spica of the Groin.*

Application. — Place the body of the cravat obliquely across the front of the pelvis, from the crest of the ilium to the lower aspect of the hip on the opposite side; carry the upper tail of the bandage transversely across the back to the other ilium; then direct the lower tail around the back of the thigh, to ascend in the fold of the groin, meeting the other angle at the ilium of the affected side, where they should be tied, Fig. 97.

Fig. 97.

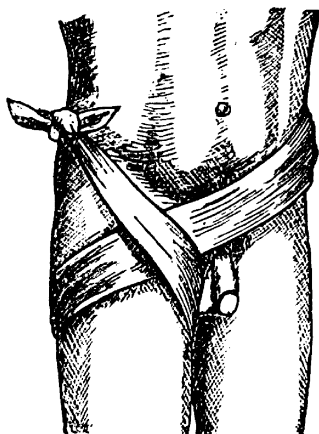


Fig. 98.



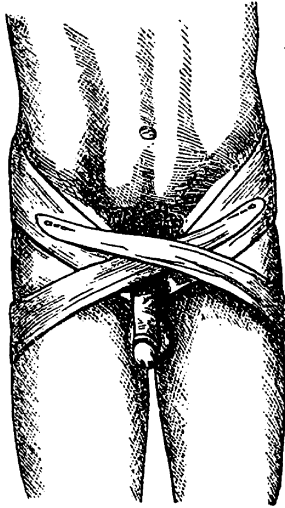
Use. — To retain dressings to one groin, as in the treatment of bubo. The readiness with which it can be removed renders it preferable to the roller. If it be desired to cover the hip, the cravat can be spread out and applied as represented in Fig. 98; thus forming a very effectual means of retaining dressings to abscesses resulting from disease.

7. *Double Spica of the Groin.*

Application. — Having two cravats tied together by an extremity of each, place the knot a little on one side of the spine; carry the free ends over the innominati, in the line of the groin,

between the thighs, and round their outside, fastening to the bodies of the cravats, as shown in Fig. 99.

Fig. 99.



Use.—To retain dressings to both groins.

SECTION III.

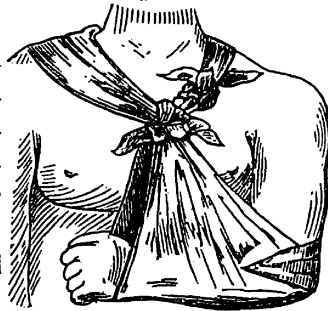
THE HANDKERCHIEF AS APPLIED TO THE EXTREMITIES.

1. *Cervico-Brachial Sling.*

Application.—Tie a cravat loosely around the neck; then place a handkerchief, folded into a triangle, with the base next to the wrist, beneath the forearm; carry its angles upward to tie in the cravat, bringing the apex of the triangle around the elbow, to fasten with a pin, Fig. 100.

Use.—To support the forearm, and is admirably adapted to this purpose.

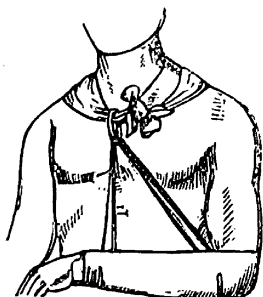
Fig. 100.



2. *Ante-Brachial Trough.*

Composition.—It may be constructed of pasteboard or leather, which may be covered by some appropriate material to give it a more finished appearance; then, by means of cords, suspend it from a cravat tied loosely about the neck; or the cords may be made to pass through a ring on the cravat, which will give greater ease and freedom of motion, Fig. 101.

Fig. 101,



Application.—Having it thus prepared, it only remains to have the forearm properly dressed and placed in the trough. If it be desired to support the hand, a thin piece of wood can be laid at the bottom, permitting it to project far enough to answer the purpose.

Use.—To afford support to the forearm and hand in cases of injury.

3. *Metatarso-Malleolar Cravat.*

Application.—Place the body of the cravat obliquely across the instep, and carry one extremity above the other around the sole of the foot and instep, to join it in front of the ankle, Fig. 102.

Use.—To retain dressings.

Fig. 102.



Fig. 103.



4. *Cap of the Foot.*

Application.—Placing the base of the triangle under the instep, carry the summit, or apex, over the toes, and the tails around the malleoli to inclose the foot, Fig. 103.

Use.—To retain dressings to the fore part of the foot.

5. *Tarso-Pelvien Cravat.*

Application.—Pass one cravat around the pelvis, and, with another tied around the foot, fasten it to the band first applied, B, Fig. 104.

Fig. 104.

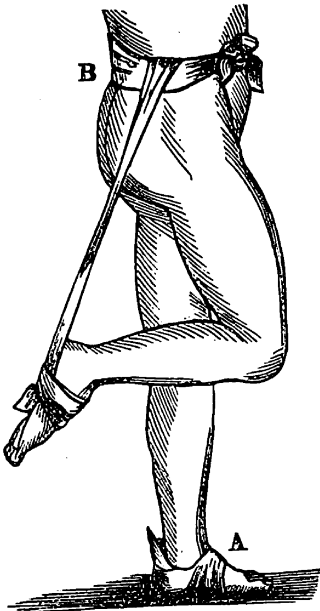


Fig. 105.



Use.—To support the limb or to keep the foot extended, as in ruptured tendo-Achillis.

6. *Tibio-Cervical Cravat, or Sling.*

Application.—Pass the body of a cravat over the shoulder opposite the affected limb, allowing the angles to fall obliquely across the body to a point immediately above the ilium of the

injured side, where the extremities are to be tied to each other. Then flex the leg to the required angle, applying a triangle so that its base will correspond to the ankle, and the apex to the knee; carry the tails upward along the thigh, to attach them to the cervical cravat near the pelvis, Fig. 105.

CHAPTER III.

CONSIDERATION OF ELEMENTARY OPERATIONS.

Under this head will be considered a class of duties which are of the first advantage to the surgeon, as regards his complete success in all surgical operations demanding manual dexterity and professional skill. They may be subdivided and treated of as the Duties of Surgeon; Duties of Assistants; Anæsthesia; Preparation and Manipulation of Instruments; Incisions; Means of Arresting Hemorrhage; Closing of Wounds, etc.

SECTION I.

DUTIES OF SURGEON.

The object of every operation is the removal of some affection, constitutional or traumatic, which either places the life of the patient in jeopardy or seriously interferes with the comfort and utility of existence; and hence the more perfectly the surgeon can accomplish this object, the more fully will his duty be discharged. Success, then, is the great end to be attained; but let no one so misapprehend the importance and the responsibility of operating as to regard rapidity and elegance of execution the only requisite by which to secure eminence in the profession. There are various other qualifications equally or still more necessary, which can only be afforded by an intimate acquaintance with the *science* as well as the *art* of surgery, together with a thorough knowledge of medicine. There is to be made a correct diagnosis—in all instances a *sine*

qua non to any operation—concerning the nature and extent of the connections of the disease; obscure visceral affections are to be detected and removed; the moral and physical condition of the patient must be comprehended and regulated preparatory to the operation, and the most favorable time chosen for its performance. After its completion, the general health must be attended to, and every available means brought into requisition to combat successfully any sequelæ or complications that may arise. Error of judgment has often induced operations which were in no wise consistent with the indications of the case. The propriety of amputations has been more than once subsequently doubted; operations for fistula in ano, and the performance of plastic operations, have frequently left the patient in a worse condition than he was previously. It may be said, however, that success in operative surgery depends in a great measure upon the selection of cases; and no surgeon, who properly estimates his own reputation and the credit of the science, will hazard an operation in a notoriously hopeless case, with a view of giving the patient what is called a “last chance;” for usually in such instances the sufferer is hurriedly dispatched in advance of his time by the interference.

The state of the patient's constitution influences the success of an operation far more than the mechanical dexterity with which it is performed. It is no uncommon circumstance to see patients sink after the most skillfully-performed operations for hernia, stone, ligature of arteries, etc., owing to some morbid condition of the system that disposes to diffuse inflammation; whereas, some patients will make the most remarkable and rapid recoveries after they have been mutilated with little or no skill. Persons of an irritable and anxious mind, or if depressed by fear, and especially feeble and hysterical women, with little power of circulation, can not bear the shock and exhaustion of an operation as well as those of a more tranquil mental constitution and of robust health. Those, too, who are addicted to the habitual use of alcoholic stimulants are also very unfavorable subjects for operations. The condition of the patient's heart, also, should be a matter for consideration before deciding in favor of the use of the knife. Fatty degeneration of this organ, as indicated by its feeble action, by irregularity and want of power in the circulation, by breathlessness, and by a distinctly-marked arcus senilis, should make the surgeon cautious

about hazarding an operation attended with much loss of blood or shock to the nervous system. Disease of the lungs of a phthisical character, when active or advanced, is incompatible with the success of an operation, as a general rule. Perhaps the most serious constitutional affection militating against the success of an operation is a diseased state of the kidneys, with albuminuria or diabetes, as the inflammatory action that is set up is apt to run into a low diffuse and sloughing form. And it is especially to be observed that, unless there exist the most urgent necessity, no operation should be performed while the patient is suffering from erysipelas, phlebitis, or any diffuse inflammation; and should there even be an epidemic prevalence of these diseases, no operation is advisable.

The *causes of death* are partly dependent upon the effects of the operation itself; but in the majority of cases they are due to a want of the proper hygienic measures. Fatal diseases will some times supervene on the most simple operations, as the removal of a finger or toe, or of small encysted tumors of the scalp, being generated by some condition of the system altogether unconnected with the wound that has been inflicted—a condition which only required a local disturbance to call it into activity. These local inflammations present themselves to the surgeon as a most formidable enemy, being regarded as the most frequent cause of fatal results consequent on operations. They are of a diffused, congestive, or adynamic character, and are divided into two distinct kinds, according as they attack the wound itself, or some portion of the system remote from the seat of the injury. In the first kind are found the various forms of erysipelas, diffuse inflammation of the cellular tissue, phlebitis, hospital gangrene, diffuse suppuration of bone, etc. The other variety includes those secondary affections which attack some internal organs, as the lungs, liver, brain, or gastro-intestinal membrane. The most frequent of these complications is congestive inflammation of the lungs, which is an almost invariable accompaniment, if not a cause, of death in surgical fevers. In view, then, of the serious embarrassments likely to arise from an error in diagnosis; in view of the danger consequent on every important operation, owing to its depressing effect on the system, and the complications liable to ensue requiring mature judgment and the most consummate skill, that they may be conducted to a favorable

termination—together with the duty which every surgeon must feel he owes to the profession—it becomes a matter of the very first consequence that the operator comprehend and appreciate the full measure of the responsibility attaching itself to him in the performance of every operation. But having been convinced of the propriety of having recourse to the knife; having fully and unreservedly laid before the patient and family the reasons that render an operation imperative; having, furthermore, carefully considered each successive step to be taken, provided for every emergency which can possibly arise—he should proceed to the performance of his duty with self-reliance, and with that full confidence which facilitates the accomplishment of every undertaking.

SECTION II.

DUTIES OF ASSISTANTS.

Different operators vary much respecting the number of assistants whom they employ; some surgeons preferring to do nearly everything for themselves, whereas others leave all the minor arrangements to their subordinates, confining their duties only to the chief steps in the operation. In all capital operations, however, four will usually be required—one for the administration of the chloroform, another to command the arteries, a third immediately to assist the operator, and the fourth to hand sponges, instruments, etc. Each one is thus to have his duty assigned him, and to which he should strictly confine himself, offering no suggestion nor asking any questions during the progress of the operation. Neither should the surgeon be hindered by others crowding near him to see what he is about. The responsibility rests with him entirely, and every advantage should be accorded to him that will in any manner contribute to his success. The assistants should always be previously made acquainted with the object of the operation, together with the peculiar views of the surgeon; the latter also specifying the emergencies that may arise, and the change of duties which would be required in the event of any accident. Though the assistants themselves be practitioners, which is usually the case, these brief hints are equally applicable, as they are quite as likely

to become over-officious as are their more unprofessional friends. In short, silence and attentiveness are especially to be enjoined during the performance of an operation. By observing these brief though exceedingly important rules, much confusion and embarrassment will often be obviated.

SECTION III.

ANÆSTHESIA.

Although the inducing of anæsthesia is attended with a certain degree of danger, still, the immunity from pain which is thus purchased has more than counterbalanced the fears and prejudices concerning it; and hence, the introduction of anæsthetics into surgery has undoubtedly accomplished more in elevating the "chirurgic art" to public esteem than any other adjuvant possessed by the profession. It is not only invaluable to the patient in preventing the occurrence of intense pain—which may of itself, if long protracted, even produce death—but it also relieves the surgeon of the distress of inflicting it, and enables him to operate with greater facility than might otherwise be possible. The administration, however, of so powerful an agent as either chloroform or ether must be conducted judiciously, or even with caution, as otherwise very serious consequences may ensue. But simply because anæsthetics are liable to abuse, *is no good reason why they should not be properly employed.* The same argument would be equally as valid against the most valuable remedies of the materia medica.

Chloroform is by many surgeons preferred to ether. It is obtained by the distillation of chloride of lime with rectified spirit, and should seldom if ever be employed without testing its purity, which, according to Fleming, of Dublin, is accomplished by holding a piece of litmus-paper over the mouth of the bottle; if the vapor reddens or bleaches it, the article is unfit for inhalation. Secondly, drop a little into a glass of water, or a solution of nitrate of silver. If the chloroform remains like a transparent globule at the bottom, it is good; but if the globule appears like a muddy lens, or becomes opalescent, it is adulterated, and unfit for inhalation.

The severity of an operation should in all cases determine the extent to which it should be given. In the greater operations, as amputations, lithotomy, and the ligature of arteries, etc., a sufficient quantity should be given to paralyze muscular movement, as well as to suspend sensibility and consciousness. It is also necessary to induce complete muscular relaxation in operations implicating the abdominal walls, as without it great inconvenience and perhaps danger might result. In short, an entire loss of consciousness should be effected in all of the more important operations, and especially in those which are necessarily somewhat protracted, and would otherwise be intensely painful. There are certain diseased conditions of the system which require that it should be administered with the greatest care; such, for example, as fatty degeneration of the heart—though in valvular disease of this organ it can undoubtedly be given with impunity. In persons who are epileptic, and in those who suffer from congestion of the brain, much caution should be exercised, as well as in the case of hysterical patients, as it is likely, in case of the latter, to induce laryngeal spasms. But the most dangerous condition is that supervening on renal affections, the blood being loaded with urea. In such cases epileptiform convulsions are readily excited, accompanied by lividity of the face, and a tendency to stertor and coma. It can, however, with scarcely an exception, be inhaled with perfect safety in the early stages of phthisis. Dr. Simpson, of Edinburgh, states that he has given it to “persons suffering under chronic pulmonary disease, not only without injury, but in some cases with decided benefit.” As a general rule, it may be stated that whenever the constitutional affection has not so far advanced as to contra-indicate an operation, chloroform may be given.

It has heretofore been a question as to whether chloroform is admissible in cases of severe injury requiring an operation, before the patient has entirely recovered from the shock consequent on the accident. In considering this point, it may be observed that in all cases where the shock—nature’s anæsthesia—is not sufficient at the time of operating to destroy the sensibility of the part, the nervous depression may be increased to the required extent by the employment of an anæsthetic.

Death from chloroform may occur in three different ways, viz:

From coma, asphyxia, or syncope; that is, its influence may become fatal by its action on the brain, the lungs, or the heart.*

Ether (sulphuric) is obtained by heating together equal parts, by weight, of oil of vitriol and alcohol. It may be washed and tested in the following manner: Pour about six ounces of the liquid into a large bottle, and add half a pint of water; agitate them by shaking, and pour all the contents into a filtering glass, or decant the ether carefully. The ether, being slightly soluble in water, and lighter, will float, and may be readily poured off, while any alcohol it may contain will unite rapidly with the water, and sink with it when the agitation ceases. If any sulphuric acid is present, litmus-paper, dipped in the ether, will be reddened; but if free from the acid, the paper will remain unchanged. If the ether, when poured on a cloth and allowed to evaporate, leaves much odor, it is impure.† This agent was first introduced as an anæsthetic by Morton, of Massachusetts, or perhaps by Wells, of Connecticut,—it not being positively known which; but the profession is indebted to Dr. Warren for the most valuable suggestions which have ever been offered respecting its administration and utility. Its effects are not so soon manifested as those produced by chloroform, but are attended with a somewhat higher degree of excitement. No deaths having resulted from its use, American surgeons have, in civil practice, employed it almost entirely in preference to chloroform; though the two combined in the proportion of one part of the latter to five parts of the former have been quite extensively used, and undoubtedly constitute the most reliable agent employed.

* In Circular No. 6 of the Report on the Extent and Nature of the Materials available for the Preparation of a Medical and Surgical History of the Rebellion, p. 87, the following interesting statement is made:

“There have been consulted, in regard to the employment of anæsthetics, the report of 23,260 surgical operations performed on the field or in general hospitals. Chloroform was used in 60 per cent. of these operations, ether in 30 per cent., and in 10 per cent. of the cases a mixture of the two was administered. At the general hospitals, the greater safety of ether as an anæsthetic was commonly conceded. It was often employed, and no fatal accident from its use has been reported. In the field operations, chloroform was almost exclusively used. The returns indicate that it was administered in not less than 80,000 cases. In several instances, fatal results have been ascribed, with apparent fairness, to its use.”

† Jackson on Anæsthetic Agents.

Manner of Administering Anæsthetics.—Having the patient placed in the most convenient position for the operation, the neck being freed from all constriction produced by any portion of the dress, and the stomach empty for at least three hours previous to the operation, the assistant who is to administer the anæsthetic should place himself near, and, if convenient, behind the patient's head; then pouring half an ounce of the liquid over the surface of a cup-shaped sponge, or a towel folded into a similar shape, apply it over the mouth and nostrils to within, at first, about two inches of the surface. After a few long and deep inspirations have been taken, the sponge should be raised to allow a breath or two of air, when it may be replaced a little closer. But especially should it be recollected that in no instance is it safe to neglect to raise the sponge frequently to admit fresh air to the lungs. During the administration the pulse is to be closely watched, which will at the commencement be somewhat quickened, but will soon begin to diminish in frequency, when the inhalation may be checked. At this time careful attention must be paid to the perfection of the respiration; for so soon as the *breathing becomes stertorous*, the instances are rare that the patient has not entirely lost both sensibility and consciousness, when of course the sponge should be removed. The state of the muscles may be determined by raising the arm, which, if it fall as if lifeless, the pulse being full, is good evidence—together with the loss of sensibility, which may be ascertained by pinching a fold of the skin—that the operation may safely proceed, the sponge being reapplied as often as the patient begins to revive.

Dr. Simpson* has observed that in order to induce the most perfect anæsthesia, the following conditions are necessary: First, the patient should be left in a state of absolute quiet and freedom from mental excitement, both during the induction of etherization and in the recovery from it. All talking and questioning must be strictly prohibited. Secondly, the primary stage of exhilaration should be entirely avoided, or at least be reduced to the slightest possible limit, by impregnating the respired air as fully with the vapor as the patient can bear, and by allowing it to pass into the lungs both by the mouth and nostrils, so as to superinduce its effects rapidly.

*Simpson on Anæsthesia, p. 27.

Resuscitation of a Patient when Overdosed by an Anæsthetic.—The measures adopted must be prompt and efficient, and conducted upon the following principles: First, the establishment of respiration, either natural or artificial, so as to empty the lungs of the vapor contained in the air-cells. Second, the stimulation of the heart's action, and the maintenance of the circulation. The first principle is particularly applicable in the asphyxial form; the second, when symptoms of syncope are present. The means to be employed in accomplishing the object stated in the above principles are given in the following rules:

1. Thrust the forefinger into the top of the larynx, and remove the epiglottis from it, if spasmodically closed.
2. Induce artificial respiration by pressing alternately on the chest and abdomen, so as to excite the diaphragm, breathing at the same time into the patient's mouth, while his larynx is pressed gently backward so as to close the œsophagus, and prevent the air passing into the stomach.
3. Apply strong aqua ammonia on a sponge so soon as the patient gasps, or before, if the effort is not made soon.
4. Dash cold water on the face, top of the chest and head.
5. If an electro-magnetic apparatus be at hand, muscular action may be sustained in the heart and chest by applying one of the electrodes over the phrenic nerve, at the point where the omo-hyoid muscle crosses the sterno-cleido-mastoid; the other electrode should be pressed firmly into the seventh intercostal space, alternating the application of each so as to create a shock.

Other Means of Inducing Anæsthesia.—M. Broca discovered that by permitting a patient to look intensely at a brilliant object placed six or eight inches in front of the face for a few moments, a cataleptic condition would often be produced, depriving the patient of all sensibility. Three out of five attempts were reported successful.

Kerosolene, a liquid hydro-carbon obtained by the distillation of coal, has been recommended. It is said to be effectual, tasteless, with an unirritating vapor. Like the above, however, it has been very little used.

Opium, together with a variety of vegetable narcotics, produces a degree of insensibility to pain when inhaled; though none of the means which were employed previous to the discovery of ether and chloroform are now regarded as worthy of use.

Nitrous Oxide.—This agent, prepared by heating pure nitrate of ammonia, and collecting the gas over water, is chiefly used by the dental profession in the extraction of teeth, and is also successfully employed in the removal of small tumors, evacuating abscesses, opening felons, and in other simple operations. Its effects, however, are too evanescent to render it reliable in operations of any considerable magnitude; which, together with the time and care required for its manufacture, and the cumbersome character of the apparatus necessary for its administration, will be quite sufficient to prevent its superseding the use of ether and chloroform to any great extent.

LOCAL ANÆSTHESIA.*

The term Anæsthesia is of ancient origin. It is mentioned in the writings of Dioscorides, who flourished fifty years after the birth of Christ, and who, in speaking of a plant called mandragora, says "that it was given to cause insensibility in those who were to be cauterized or operated upon; for, being thrown into a deep sleep, they do not perceive pain." Such Greek writers as Pliny, Apuleius, Aretæus, Celsus and others, speak of it, and ascribe to it anæsthetic properties. It appears, from recent investigations, that the Chinese have for more than a thousand years employed a preparation of hemp, or ma-yo, to deaden the pains attendant upon surgical operations. If the records of medicine are carefully examined for six hundred years past, many allusions will be found which refer to the description of medicines acting as anæsthetic agents; and by referring to Holy Writ, in Amos, chap. ii, 8th verse, will be found the following: "And they lay themselves down upon clothes laid to pledge by every altar, and they drink the *wine of the condemned* in the house of their God." The "*wine of the condemned*" here spoken of is believed to have been some narcotic in common use in ancient times, and administered to condemned criminals. It has been asserted by some biblical commentators that the "*vinegar and hyssop*," given to our Blessed Savior to drink when he was being crucified, was in reality some narcotic. It was a common practice among the Romans and Greeks to administer such agents to criminals before and after

* Contributed by T. G. Comstock, M. D., of St. Louis.

condemnation. Mandragora seems to have fallen into disuse, probably because charlatans, magicians, traveling gipsies, fortune-tellers, jugglers and witches employed it to narcotize their dupes, and therefore it became disgraceful for the profession to use such agents. The inhalation of ether and chloroform is familiar to every one at the present day; but we well remember how we were thrilled at the idea of the benefits such agents must give to surgical practice, when the first successful experiments were made with the former twenty years since. And yet, if we refer to the writings of Baptista Porta, in 1608, in his book upon "Natural Magic," we will find that he describes a "pomum somnificum," made of opium and mandragora, "the smelling of which binds the eyes with a deep sleep;" and then he speaks of a quintessence, "which, if you hold to a sleeping man's nostrils, whose breath will suck up this subtle essence, which will so besiege the castle of his senses that he will be overwhelmed with a most profound sleep, not to be shook off without much labor. After sleep, no heaviness will remain in his head, nor any suspicion of art. These things are manifest to a wise physician—to a wicked one [undoubtedly referring to the charlatans and mountebanks] obscure." Who can fail to recognize a pretty good description of the effect of some anæsthetic agent inhaled in the same way as we give chloroform and ether at the present day?

Only twenty years ago, when, by the use of ether, limbs were amputated without pain, the world looked on with astonishment; and not a few of our own profession were incredulous, and refused to have any part, parcel, or countenance in any such innovation. Yet, a little more than one hundred years earlier, Frederick Augustus II, the Strong, Elector of Saxony and King of Poland, had his leg amputated without any cognizance of it, his surgeon having administered to him some secret anæsthetic agent, and induced upon him a deep sleep, when his limb was amputated, and all this without even the consent of his Royal Highness, who was not aware of it until the following morning. The history of anæsthetics proves the adage that there is "nothing new under the sun." To our countryman, the late Dr. Horace Wells, of Hartford, Connecticut, is due the immortal honor of discovering the use of ether, when given by inhalation in annulling the pain of surgical operations; and to Sir J. Y. Simpson,

of Edinburgh, for the discovery of chloroform in 1847. The general effects of ether and chloroform we do not propose to speak of further than to mention that they are anæsthetic agents operating upon the whole system; and it has long been a desideratum to find an agent that could be applied locally to a part—one that would temporarily deaden any portion of the human body, so that an operation could be made without pain. Such a discovery has been made within the past year by Dr. B. W. Richardson,* of London.

It has long been known that the application of a freezing mixture to a part acts as a local anæsthetic; and many operations have been made, assisted by this proceeding, with success and without pain to the patient. This was first suggested and brought into actual practice by Dr. Arnott; but it was not practicable, because not convenient, and not sufficiently under the control of the operator, and was, therefore, abandoned. For some years past, surgeons have made numerous experiments to produce local anæsthesia with chloroform, Indian hemp, aconite, etc., by immersing the hand in them for hours, but without success; the results were negative and unsatisfactory.

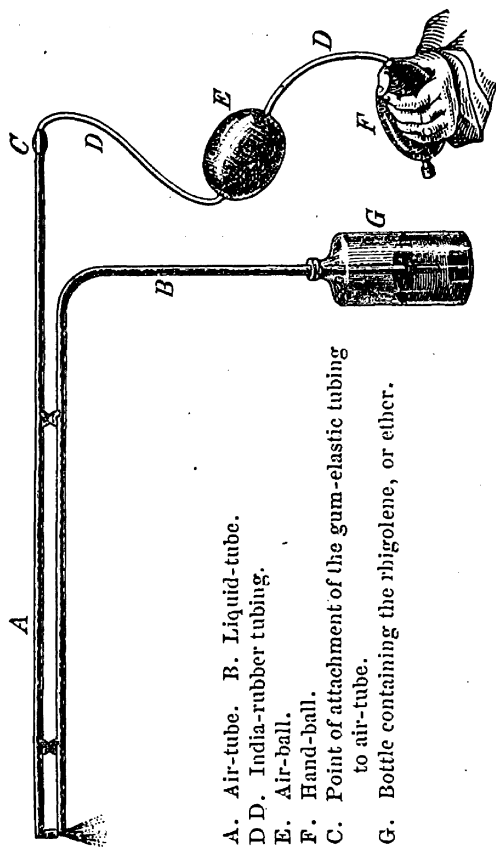
Dr. Richardson was struck with the idea that an instrument in common use in England and upon the Continent, for diffusing the spray of eau de cologne, might be employed for producing local anæsthesia. His first idea was to find out the degree of cold that could be suddenly produced upon any part of the human body by the rapid vaporization of such volatile liquids as had the lowest boiling point; the rule being that the lower the boiling point of the volatile liquids selected, the greater and the more rapid would the cold be generated, and of course a temporary anæsthesia would result. Dr. Richardson† made several trials with imperfect instruments to effect a rapid vaporization of ether, with more or less success; and finally constructed one, which he describes as follows:

* See London Medical Times and Gazette, of February, March, and April, 1866.

† The nebulizer of Dr. Richardson, as well as other modifications of this instrument, may be obtained of A. M. Leslie & Co., surgical-instrument makers, St. Louis. He will furnish, also, rhigolene and the various ethers required for anæsthetic purposes.

The apparatus consists of an ordinary two-ounce (Fig. 106) bottle (graduated or not), for holding the ether. This bottle is provided with a perforated cork; and passing through it into the bottle is a double tube, made of metal, so arranged that an inner

Fig. 106.



Apparatus for Local Anæsthesia—Dr. Bigelow's Tube.

For extracting teeth, the tubes are made double, and so arranged that a nebulized spray will simultaneously strike the inside and outside of the gum.

tube is inclosed within the outer tube, and the smaller one is so constructed as to reach within a short distance from the bottom of the bottle, and upward to nearly the mouth of the outer tube. The bottle has attached to it, at right angles, just above the top of the cork, another tube a few inches long communicating with it, and to this is attached a piece of India-rubber tubing and two elastic balls, which, with proper valves, by alternately expanding and contracting,

a double current of air is produced: one current descending into the bottle, pressing upon the ether, forces it along the inner tube; and the other ascending through the outer tube, and playing upon the column of ether as it escapes through the fine jet, Fig. 106.

The material of this form of instrument is best and most durably made of silver for the air-tube, and of platinum for the liquid-tube. These materials make an elegant and finished article, capable of lasting for a lifetime.

The Principle of the Process.—The principle of this new anæsthetic process consists in directing to any part of the human body a volatile liquid having the lowest boiling point, and in a state of fine subdivision or spray, such subdivision or atomization being produced by the action of air or other gaseous substance on the volatile liquid to be dispersed. When the volatile liquid, such as ether, falls upon any part of the human body in the form of a spray, there will be a rapid evaporation of the same, and consequently an intensity of cold will immediately take place, and to such a degree as to temporarily constrict the blood-vessels and prevent the circulation from going on. There will be, consequently, an insensibility, and the part will die for the time being; but the effect being entirely local, the general circulation is not affected, and soon the blood will return to the part, and complete restoration take place.

Dr. Richardson says: "The extreme rapidity of the action of this deadening process is the cause of its safety; the process can suspend life without causing disorganization. If I may use the expression, it produces syncope of the part—temporary death—but not, necessarily, destruction. When we produce general anæsthesia, we virtually extend this mere local action to the body altogether—*i. e.*, we check the evolution of the force at the center, and produce an approach to temporary death of the whole of the organism."

Special Indications for the use of Local Anæsthesia.—It is not only applicable to a large number of minor operations, but will be found in time serviceable in some capital operations—such operations as the extraction of teeth, removal of the toe-nail, opening of felons, probing of wounds, operations for necrosis, removal of small tumors, ligaturing or excising piles, applying caustics, either the mild or potential; incising carbuncles, opening abscesses, especially mammary abscesses; applying sutures, dividing tendons, fistula in

ano et perineo, rupture of the perinæum, alleviating painful piles, returning painful hemorrhoidal tumors within the rectum; operating for vesico-vaginal fistula, hare-lip, laryngotomy and tracheotomy; removal of cancers, condylomata, or extensive syphilitic mucous-tubercles, paraphymosis; opening of buboes, or other painful abscesses; relieving the pain of neuroma, and facilitating the removal of such tumors; alleviating the pains of photophobia, neuralgia, or periostitis. It will act as a hemostatic agent in stopping the flow of blood when it is excessive and threatens danger, especially in the following operations: In cutting down upon arteries to ligature them, or operating for any form of strangulated hernia, extirpation of ovarian tumors, tracheotomy, œsophagotomy, Cæsarean section, stone in the bladder, and in any other cases where the almost instantaneous application of intense cold to congelation will produce a coagula of blood and contraction of the open mouths of blood-vessels.

In neuralgia we have used it in several instances with temporary relief; in local inflammation it may be applied; *e. g.*, in photophobia, especially in iritis, we have used it with benefit, so as to be able to examine the eye of the patient.

Various Preparations used to Produce Local Anæsthesia.—Dr. Richardson's experiments have mostly been made with sulphuric ether, and to produce the required result when ether is used, takes at least one minute or more; but with rhigolene, a new hydro-carbon recently discovered by Dr. H. J. Bigelow, of Boston,* it requires not more than from five to ten seconds. This rhigolene is a petroleum-naptha, and is one of the most volatile of all known liquids; it boils at 70°, while common ether boils only at 96° of heat. Rhigolene is cheaper than ether, has but little smell, and the odor is far less disagreeable than ether, and is so volatile that it can be atomized with less trouble; and the apparatus necessary for this purpose is less complicated and expensive than that in use when ether is selected as the preparation to be atomized. With rhigolene, the ordinary Bergson or Siegle tube in use with the "spray-producers" for conducting an inhalation, is quite sufficient. Dr. Bigelow does not use the rather complicated tube of Richardson which we have described above, but a single metal-tube, bent at right angles, and passing through a perforated cork into the interior

* Boston Med. and Surg. Journal, April 19, 1860.

of a bottle. Attached to this, outside of the bottle, is another tube terminating with a capillary opening, and so arranged as to meet at a right angle the extremity of the other tube, which also terminates with a capillary opening, some six inches beyond the cork of the bottle. This is the air tube; and the India-rubber tubing with two air balls (the same as described in Dr. Richardson's apparatus) is to be attached, and then it may be worked in the same manner as Richardson's. Rhigolene is very inflammable, and must be kept in a cool place, and not be used near a fire or lamp. A large experience with both ether and rhigolene has convinced me that the latter is by far the most reliable and practicable, and attended with no disadvantages whatever, except that, being so inflammable, it must be used with caution and not brought near any fire.

Chloroform has been tried in lieu of ether and rhigolene, but it proves very irritating to the skin; yet when mixed with ether, in the proportion of one part of chloroform to seven of ether, it will act even sooner than ether alone, and is not irritating. Dr. Richardson recommends a *Xylo-Styptic Spray*, and also a *Ferro-Styptic Ether*, as hemostatic agents, as more efficient than pure ether in controlling hemorrhage. The Xylo-Styptic Ether is prepared by saturating pure ether (at a boiling point of 97°) with tannin, and then adding Xyloidine. The Ferro-Styptic Ether is prepared by simply dissolving the perchloride of iron in ether. These preparations must be used through glass tubes.

Electricity has been employed as a local anæsthetic, but is neither so readily applied nor as effectual as cold, which latter was recommended by Dr. Arnott, of London, in 1852. He advised the application of a mixture of powdered ice and salt, which should be inclosed in a net of some thin material, and then laid immediately upon the part. This combination produces intense cold, and its action is prompt and harmless, unless kept on long enough to destroy the part entirely. It should not be kept in contact with the surface more than one or two minutes. At first the sensation is that of cold; then of insensibility, if local pain previously existed; the circulation is momentarily increased, and there is a red blush on the skin, which is soon succeeded by a contraction of the superficial vessels and extreme whiteness of the skin, this being

followed by congelation of the adipose tissue and total insensibility of the part. At this time the incision may be made without pain and without hemorrhage. This agent is particularly applicable in the removal of small superficial tumors, amputation of fingers, tocs, and evulsion of the toe-nail. It might be supposed that the reaction would develop a high degree of inflammation; experience, however, proves the contrary.

SECTION IV.

PREPARATION AND MANIPULATION OF INSTRUMENTS.

Among the numerous duties devolving upon the surgeon previous to an operation, the preparation of the instruments to be employed should be regarded as one of the most important. The fact that an experienced and skillful operator can accomplish his purpose with illy-prepared or poorly-selected instruments, while a novice may fail though using the best that can be procured, is a circumstance which does not in the least justify the former in neglecting to have his operating case in the most capital order; and hence, every reputable and careful surgeon will take especial pains to have his "mechanical therapeia" properly selected, and to see that suitable attention is given to their preparation and preservation.

Sharpening of Instruments.—A magnifying glass will show that the edge of a knife has teeth similar to those of a saw; and as the tissue to be cut is usually incised by drawing the scalpel toward the operator, it is desirable that its edge be set forward. This is accomplished by carrying the blade, from the heel to the point, along a stone or strop. In using the former, have it previously well lubricated with oil, and place the blade very nearly flat upon it; then holding the hand in a position of semi-pronation, push the knife from heel to point with its edge forward; now turning the hand in a state of semi-supination, pass the blade in like manner back to the point of starting. If the strop be used, the edge of the knife can not be made to pass first, but in the reverse manner to that employed on the stone; recollecting, however, in each case to draw the blade from *the heel to the point*, and never in the opposite direction. The manner of holding pointed

instruments, such as cataract needles, trocars, gorgets, etc., during the process of sharpening, will readily suggest itself by observing their peculiar shape.

Manipulation of Instruments.—The ability to handle instruments with facility and grace is an accomplishment that proves a decided advantage to the patient as well as the surgeon, and is therefore to be highly appreciated. A full consideration, however, of the directions required to constitute a thorough study of the art of manipulating, that dexterity and gracefulness of execution may be secured, can more readily be comprehended in connection with each operation; and hence only the principles governing the movements of cutting instruments will at present be noticed.

1. Knives, whether large or small, will cut with the greatest facility and neatness when drawn regularly and with moderate, even pressure over the tissue to be divided.

2. The motion given to the instrument should be chiefly that of traction, effected by flexing and extending the thumb and fingers in much the same manner as when using a pen; not permitting the wrist to participate in the motion except to change the direction of an incision, or when employing the amputating knife.

3. In using the scissors, a slight drawing motion should be given, as it enables them to cut with less contusion of the parts, especially if the structures are dense; and owing to the fact of their bruising the tissues by the pressing of their blades together, it is better to employ a knife, if it be at all convenient.

4. Instruments for making punctures should possess a keen edge, as they necessarily contuse the parts more or less at their point of entrance, and consequently should, as a general rule, be introduced gradually, to prevent danger of sloughing.

5. A sudden and frequent elevation of the hands from the surface on which it is supported is an error to be invariably avoided, as no incision can be thus made with the neatness and precision that is accomplished by the regular flexion and extension of the fingers, the wrist remaining at rest.

6. The manner of holding the scalpel to facilitate convenience and dexterity will be considered in the following

SIX POSITIONS OF THE SCALPEL,

As employed by the French surgeons, and which will be found all that are required in ordinary operations :

First Position.—Grasp the handle of the scalpel so that the thumb and the second finger shall be very nearly opposite each other, while the third and little fingers retain the extremity of the handle firmly in the palm, the forefinger resting on the back of the blade, Plate I, Fig. 1. By extending the finger well upon the blade, the operator can exert considerable force, thus readily dividing dense tissues, as in the extirpation of scirrhus mammæ, osseous and fibrous tumors, and in the division of tendons, ligaments, etc. When it is required to make an incision in a certain line, the integuments should be made tense and steadied, as in Plate I, Fig. 2.

Second Position.—This is the reverse of the first—the edge of the knife being upward. In this position the thumb and forefinger should be placed at the sides of the handle near its junction with the blade, while the remaining fingers are to be employed in pressing it against the palm, Plate I, Fig. 4. When the scalpel is held in this manner it is designed to cut from within outward, by having an assistant raise a fold of the integument from the subjacent parts, as represented in Fig. 4, or in Fig. 2.

Third Position.—In this position the scalpel is held between the thumb and first two fingers very much like a pen, the hand being supported by the other two fingers, Plate I, Fig. 5. In commencing an incision, the point of the blade should be inserted into the tissue by a perpendicular pressure of the fingers in an extended position; after which the blade is to be drawn toward the operator by strongly flexing the first and second fingers, and the incision terminated by a perpendicular pressure of the knife at the point where it is wished to stop, in order to prevent making a shallow, irregular cut, called a “tail.”

Fourth Position.—This is the reverse of the last—the edge of the scalpel being upward, so as to cut from the operator, Plate I, Fig. 6. This and the third are two very important positions of the knife, and are always required in the removal of tumors, ligation of arteries, etc.

FIG. 3

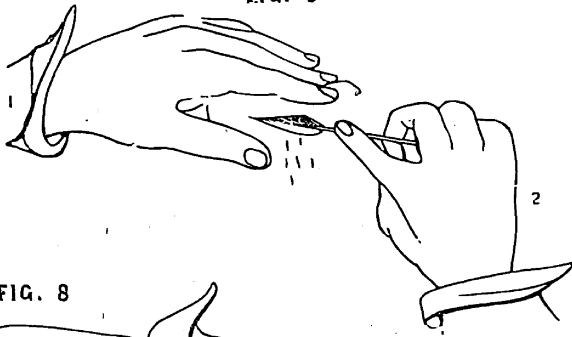


FIG. 8

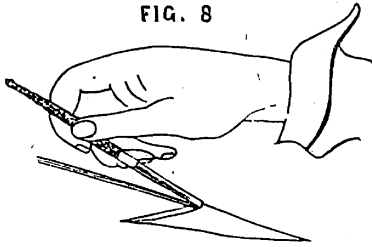


FIG. 7

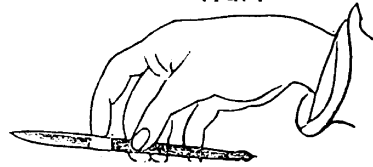


FIG. 1

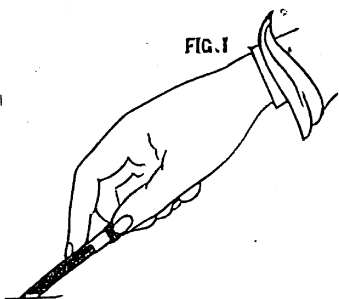


FIG. 5

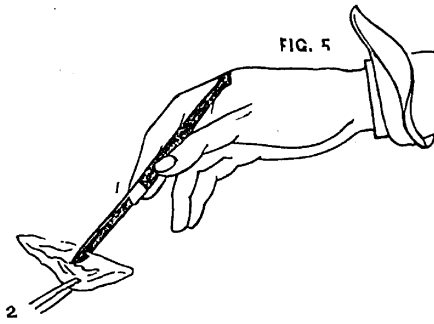


FIG. 2

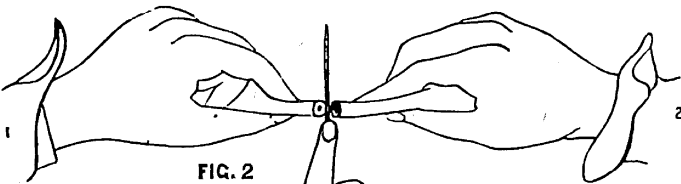
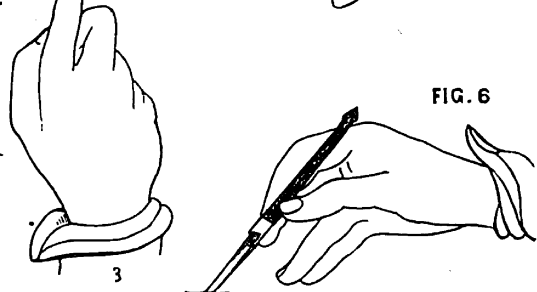
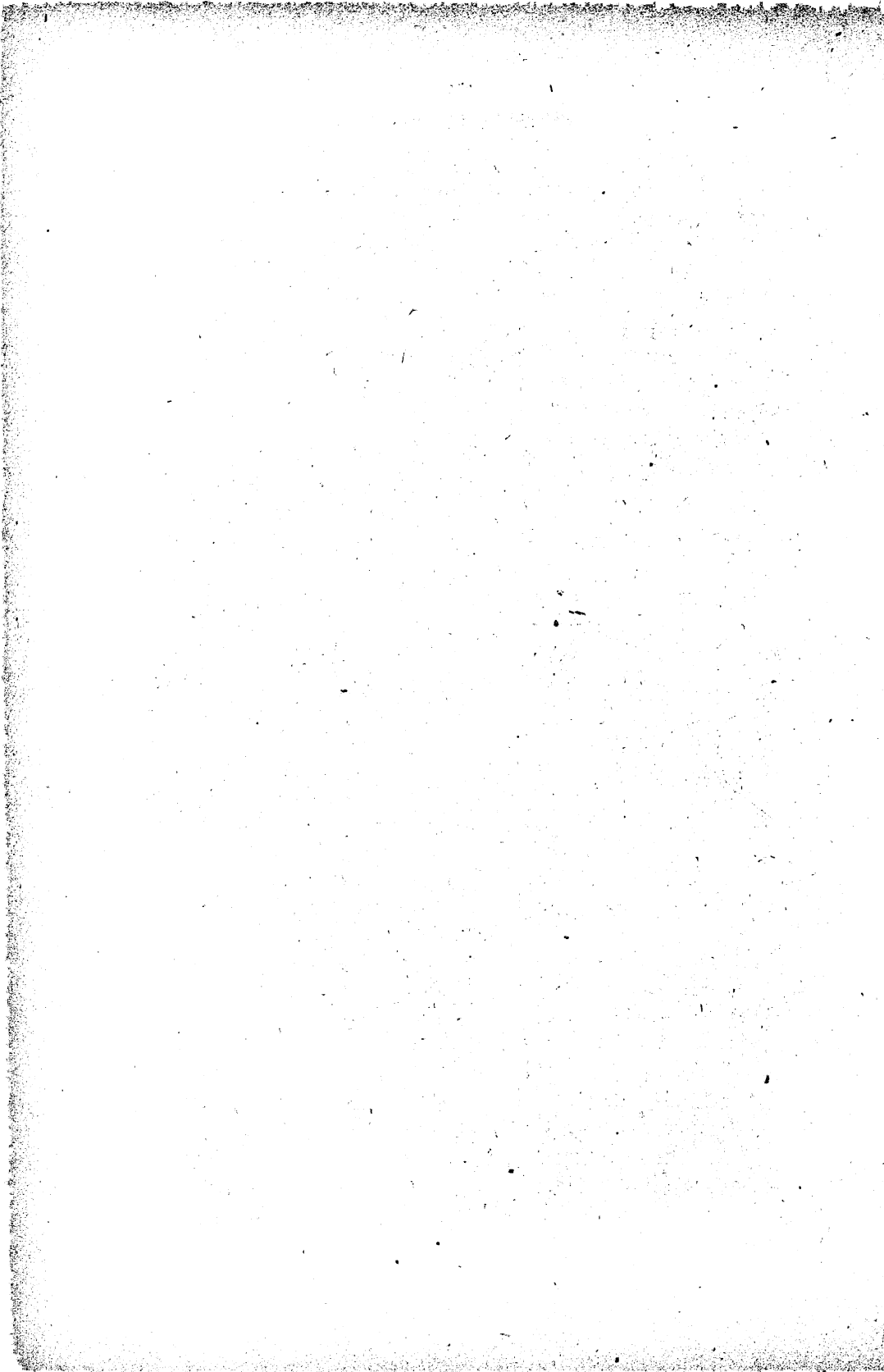


FIG. 4



FIG. 6





Fifth Position.—In this position the scalpel is held like a fiddle-bow—the four fingers being approximated on one side of the handle and the thumb on the opposite side, Plate I, Fig. 7. This easy position enables the surgeon to make light, delicate strokes with the knife, as in the division of the tissues over hernia, large blood-vessels, and the like.

Sixth Position.—This requires that the knife be held with the fingers flexed, the edge of the blade being directed toward the hand, Plate I, Fig. 8. The tissues being raised on a director, the incision is made toward the operator.

Acupuncturation.—This consists in making punctures through the tissues by the introduction of delicate needles, which may be either of gold, silver, platina, or steel. The manner of performing the operation is simply to support the needle with the thumb and forefinger of the left hand, while with the thumb and forefinger of the other hand it is made rapidly to rotate until the point has penetrated to the required depth. Several may be introduced in like manner at short distances from each other. The most marked benefit has been ascribed to their use in particular cases, accompanied by intense pain, as for example in neuralgia; though the success attending their application has not been so constant as to bring the operation into very general favor.

Electro-Puncture.—In this operation the needles are passed through the skin as far as desired in the same manner as in acupuncturation, and the electric fluid conveyed to the affected part by bringing the poles of an electro-magnetic machine in direct contact with the head of the needle. Care should be exercised not to make the current so severe and continuous as to heat the needles, and thus convert them into actual cauteries.

This procedure will sometimes be found serviceable in *paralysis*, *rheumatism*, *deafness*, *amaurosis*, etc.; though the cases in which it is particularly indicated are not well marked.

Hypodermic Injections.—The hypodermic method of administering remedies is accomplished by the use of a syringe having a sharp, needle-like point, which being introduced beneath the skin, a small quantity of the liquid is forced into the cellular tissue and rapidly absorbed. Some very satisfactory results have attended this procedure, especially in injuries and diseases of the nervous system.

The successful treatment of several hundred cases of intermittents have also been reported.* It is necessary, however, to exercise care, in order to avoid as much as possible the occurrence of local irritation, as otherwise the operation is liable to be followed by suppuration. In ordinary cases it is quite probable the making fine punctures with a needle, and applying the solution externally, will answer as well as the use of the syringe. In severe cases resisting the internal administration of remedies, the operation may be resorted to, and is worthy of trial.

SECTION V.

INCISIONS.

The variety of incisions may be indefinitely multiplied to suit the circumstances of the case; though the kinds most frequently employed include—

1. The **Simple Incision**, which consists of a single line, either straight or curved.

2. The **Compound Incision**, which is made by a combination of straight lines forming a cut resembling the letters **V**, **L**, **T** and **H**; also, a **X** or **∩**, or of curved lines in the form of an ellipse **∪**, or double-crescent **∩**.

3. The **Subcutaneous Incision**.—This variety of incision enables the surgeon to effect a division of parts without exposing them to the atmosphere, and hence union occurs with little or no inflammation. It is used principally in dividing tendons, opening joints, and in evacuating chronic abscesses, especially if all the contents of the latter are not to be removed at once. The operation is accomplished by introducing a sharp-pointed knife obliquely through the integument at a little distance from the part to be divided; after pushing the blade forward sufficiently far to allow the edge to rest immediately over the tissue to be cut, depress the edge upon the part, and give a slightly rocking motion to the handle. Carefully withdrawing the instrument as it was entered, close the orifice by adhesive plaster or collodion. This incision is also made—particularly in cases of abscess, where it is desirable to exclude the air—by

* London Lancet, April, 1865.

pinching up a fold of the integument covering the part, and passing the point of a bistoury through the base of the fold; after the operation, close the opening as before.

A few very important rules to be observed in making the simple and compound incisions may be appropriately appended:

1. Make the cuts sufficiently free to give ample room for the subsequent dissection, having the tissue to be divided previously made tense.

2. Remove the blade of the knife as seldom as possible from the line of incision, to avoid irregularities or notching of the tissues.

3. Have the hand in which the knife is held well supported while operating; which can usually be done by resting the little and the ring finger upon the surrounding parts. If the structures to be dissected are delicate and important, it is better to employ the director and bistoury than trust to the steadiness of the hand alone.

4. Make the direction of the incision such that the scar may come in the course of the contractions or fibers of the subjacent muscles, by which means the cicatrix may be partially, if not entirely, hid in the folds of the skin; thus on the forehead the cut should, if possible, be transverse, to correspond with the wrinkles occasioned by the action of the occipito-frontalis; on the cheeks, in the line of the levator anguli oris, or levator labii superioris alæque nasi; on the neck, in the line of the sterno-cleido-mastoid muscle.

In the division of arteries during the course of an operation, it often becomes a question with the surgeon whether he shall stop to ligate them, or proceed as rapidly as possible to complete his dissection. No definite rules can be given by which to decide this question, as it will depend in a great measure upon circumstances, such as the condition of the patient, the importance of the operation, whether the parts be superficial or deep, the vessels large or small, etc.

In operations upon the breast, or in removing tumors from other parts of the body, it is usually the case that most of the branches which are unavoidably divided contract sufficiently by the stimulus of the atmosphere to arrest the hemorrhage, thus making interference unnecessary.

CHAPTER IV.

MEANS OF ARRESTING HEMORRHAGE.

Whether hemorrhage be the result of accident or disease, or incidental to surgical operations, it is always a phenomenon claiming prompt attention, and often demands a manifestation of all the surgeon's skill and self-possession. Hence, it is necessary to be familiar with the various forms which it may assume, and with all the available means for arresting it, including the circumstances to which each method is most applicable.

The *arterial*, *venous*, and *capillary* forms of hemorrhage are readily distinguished from each other by observing that when an artery is wounded the blood escapes in jets, synchronous with the pulsations of the heart, and is of a bright red color; venous blood, on the contrary, flows steadily, and is of a dark purple hue. If the bleeding proceed only from the capillaries, there will be a general oozing of red blood from the surface of the wound. In the division of a large artery, however, the blood may flow from its distal extremity, swelling out in very much the same manner as from a vein; its true source, in this instance, is to be determined by its color. On the other hand, venous blood may be given forth in jets, owing to the vein's being placed immediately over an artery, and having the pulsations of the latter communicated to it; and here the dark color of the blood will disclose its source. As a general rule, it may be remarked that no fears need be entertained concerning the division of the capillaries, or of veins of medium size, as the spontaneous coagulation of the blood is sufficient to prevent any serious loss.

Arterial hemorrhage may be arrested without surgical interference: 1. By the patient's becoming faint. 2. By a retraction of the vessel within its sheath. 3. By its contraction; and, 4. By coagulation. The first of these conditions acts only temporarily, and so soon as the activity of the circulation is restored, the bleeding will be likely to recur, as one form of *secondary* hemorrhage.

I have now to consider the various methods by which hemorrhage may be artificially arrested; and among the first and simplest is placed—

Position.—Giving a part an elevated position will sometimes be sufficient to arrest the bleeding, and will always diminish the loss of blood in an operation by favoring a return of venous blood to the heart.

Cold, by lowering the temperature of the part, exercises a degree of constriction upon the vessels and favors coagulation, thus becoming a very effectual agent. It is simply and easily applied by dipping cloths in ice-water, or filling bladders with cold water or pounded ice, and placing them in contact with the surface. It may also be applied by saturating lint, or employing the douche, or irrigation. Evaporating lotions, as diluted alcohol, may be used with similar effect in the absence of ice.

Compression is the more frequently employed to prevent hemorrhage during amputations, and in accidental wounds, as a temporary expedient. This is purely a mechanical means, and is accomplished

Fig. 107.

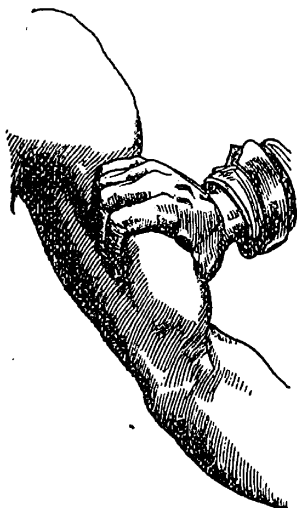
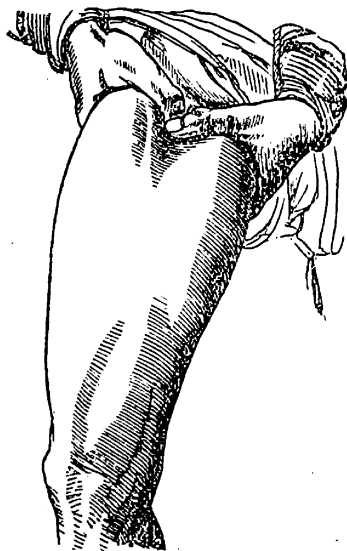


Fig. 108.



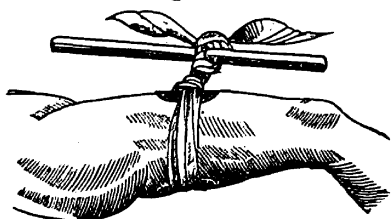
either by applying the thumb or fingers over the course of the main artery at a point where a subjacent bone will afford support, or by the use of the tourniquet. If the bleeding occur from one of the extremities, the necessary pressure should be made by placing the thumb over the artery on one side of the limb, and grasping the

other side with the fingers; or both hands may be used, placing one thumb upon the other, as in the accompanying cuts on page 159.

When the arteries are so situated that it is not convenient to apply the thumb, a common door-key, well wrapped in muslin or flannel, may be employed as a substitute by placing it over the vessel, the wards being held in the hand.

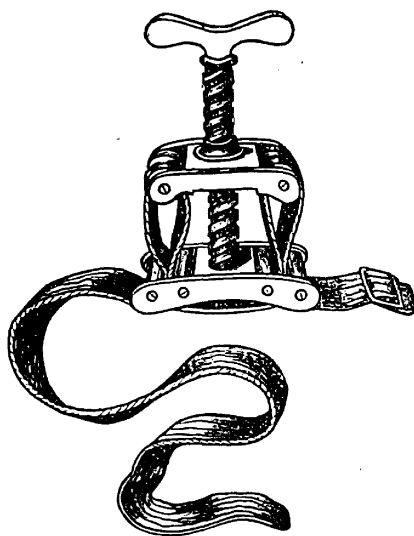
A very simple contrivance, called the *Garrot*, or *Spanish Windlass*, is of valuable service in many cases of emergency. It can be made at a moment's notice by rolling a handkerchief into a cord,

Fig. 109.



and tying a knot in its middle, which is to be placed directly over the bleeding vessel at a point where its pulsations can be the most distinctly felt, and then carrying the tails of the cord around the limb, and knotting them near their extremities; a stick is now to be passed through the loop, and the handkerchief twisted sufficiently tight to bring the walls of the artery in apposition, Fig. 109.

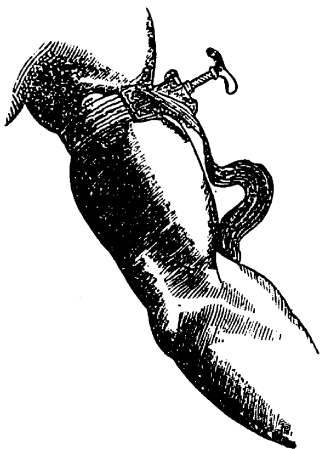
Fig. 110.



The *tourniquet*, most extensively used, and the one usually supplied in amputating cases, is that devised by the celebrated Petit,

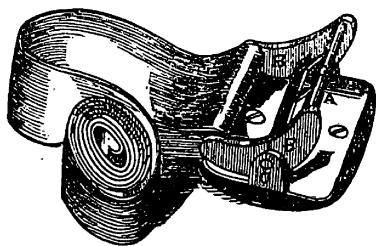
in 1718, and represented in Fig. 110. It is applied by first placing a firm roller, of medium size, over the vessel to be compressed, and then buckling the band of the tourniquet round the limb and pad, the requisite degree of pressure being obtained by turning the screw, Fig. 111. Another very efficient plan is to loosen the band or webbing that passes under the body of the instrument, and to place into the loop thus formed a firm roller; draw the band tight again, and buckle it around the limb, and turn the screw, the pad or roller resting on the artery.

Fig. 111.



The *field-tourniquet* consists simply of a strap of webbing, with a buckle and a pad, Fig. 112. Both these forms of the instrument are, however, open to the objection that they press upon the entire circumference of the limb, thus interfering with the venous as well as the arterial circulation; and hence these patterns have been variously modified and improved upon, until the great desideratum, viz., that of expending pressure upon the artery without hindering the return of venous blood, is, to a considerable extent, gained. These improvements have been especially marked since the treatment of aneurism by compression has become a standard measure.

Fig. 112.



The *horse-shoe tourniquet*, of Signorini, modified by Skey and Gross, consists of two semi-lunar sections, jointed at one end, and made to move upon each other by means of a ratchet piece, which is acted on by a key; pads are attached at the opposite ends of each section, and hence only two points of the limb are compressed. Dr. Dorsey, of Philadelphia, has described a plan in his work on surgery (Vol. I., p. 57.), which seems very practical, and which consists in placing compresses over the vessels to be con-

trolled, and over these a metallic band, which prevents the tourniquet from pressing upon any portion of the limb except that over the injured vessel. Several of the improved patterns of this instrument are represented in the accompanying cuts, Figs. 113, 114, 115; the *modus operandi* of which will be readily understood by a simple inspection of them.

Fig. 113.

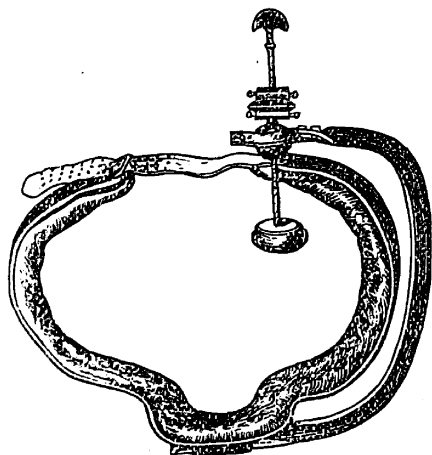


Fig. 114.

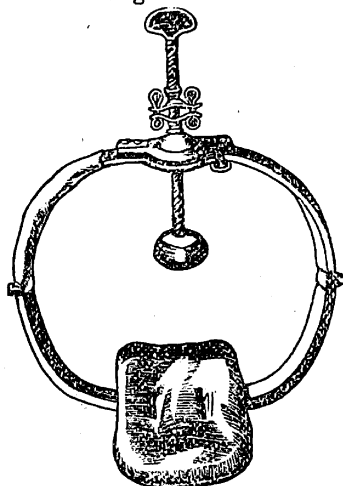
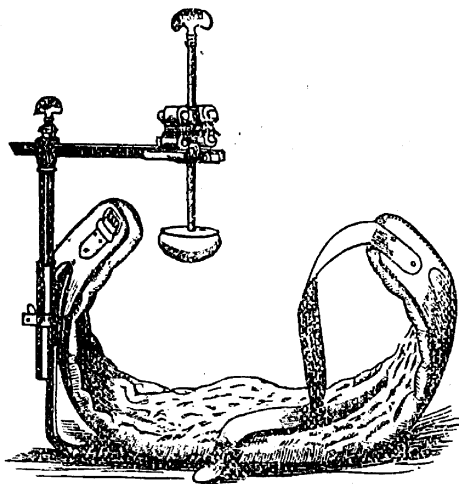


Fig. 115.



Torsion is a means of arresting hemorrhage which is very highly recommended by French surgeons, though very seldom relied upon

in this country, except in the case of small arteries. It consists in seizing the end of the vessel with a forceps, and twisting it several times upon its axis, in order to rupture the inner and middle coats.

The **Ligature**, first substituted for the cautery by the distinguished French surgeon, Pare, in 1552, offers the most safe and permanent means of obliterating the extremity of a severed artery that is employed. The vessel to be ligated should be drawn well out of its sheath by means of a tenaculum or forceps, and the ligature passed around it and tied firmly in the manner described on page 66.

If the artery be of considerable size, the tenaculum with which it is secured should not be removed until the knot is complete, as it can not be done without exposing the patient to secondary hemorrhage. On closing the wound the free ends of the ligature should be brought out at the lowest point, where they will favor the escape of pus, thus preventing the formation of abscesses.

The material of which the ligature should consist was formerly a matter of great interest to surgeons, and a variety of substances were from time to time recommended by different operators, such as kid, chamois skin, buckskin, tendon of the deer, catgut, leaden wire, parchment, silk, or hemp thread. The two latter are now used almost to the entire exclusion of every other article. Care should always be taken to have whichever is employed smooth, round, strong, and well waxed.

Acupressure.—Dr. Simpson, of Edinburgh, in 1859, called the attention of the profession to a plan of compressing the arteries by means of very sharp-pointed, slender needles, of non-oxidizable iron, headed with wax or glass—being similar to the hare-lip needle. Says Dr. Simpson: “In acting upon this mode, the surgeon may place the tip of the forefinger of his left hand upon the bleeding mouth of the artery which he intends to compress, and close it; holding the needle in his right hand, he passes it through the cutaneous surface of the flap, and pushes it inward till its point projects out to the extent of a few lines on the raw surface of the wound, a little to the right of and anterior to his finger-tip; he then, by the action of his right hand upon the head of the needle, turns and directs the needle so that it makes a bridge, as it were, *across* the site of the tube of the bleeding artery immediately in front of the point of the finger with which he is shutting up its orifice; he next, either with the same forefinger of the left hand, or with the side of

the end of the needle itself, compresses the locality of the bleeding arterial orifice and tube, and then pushes on the needle with his right hand so as to make it *re-enter* the surface of the wound a little to the left side of the artery; and lastly, by pressing the needle further on in this direction, its point *re-emerges* through the *cutaneous* surface of the flap—and the site of the tube of the bleeding artery is in this way left pinned down in a compressed state by the arc or bridge of steel that is passed over it. The needle thus passes through and from the skin of the flap *inward* to the raw surface of the wound; and after bridging over the site of the artery, it passes, secondly, from the raw surface of the wound *outward* again to and through the skin.” He has thus arrested hemorrhage without leaving, after the second or third day, any foreign substance in the wound. This method, although very simple and ingenious, has not as yet superseded the use of the ligature, nor been very extensively employed by surgeons.

Styptics may be used in the solid form, in solution, or in powder; but should only be employed in cases where the ligature can not be applied, as in bleeding from the cancellated structure of bone, from the fauces, vagina, rectum, or in case of oozing from a general surface. In the above-named instances, however, they may become very serviceable. Formerly, surgeons used them very frequently and with confidence, notwithstanding they possess the serious objection of so changing the injured surface by their action that the subsequent process of healing is materially interfered with. The more important of these agents include nitrate of silver, sulphate of copper and of zinc, alum, tannic acid, tincture of the chloride of iron, matico leaves, and creosote. The perchloride of iron, three parts to one hundred parts of distilled water, has been recommended as a hemostatic. It is applied by having lint well saturated with the solution and laid on the bleeding part, with slight pressure. Caution must be exercised, as it is quite *caustic*.

The persulphate of iron (Monsel's salt), first recommended by M. Monsel, of Bordeaux, has proved very efficient, and is in most cases to be preferred. Its application occasions no pain, and it very rapidly forms with the blood a perfectly insoluble clot, which continues to enlarge for several hours, and eventually becomes quite firm. It can be conveniently applied in solution, as it speedily dissolves in water.

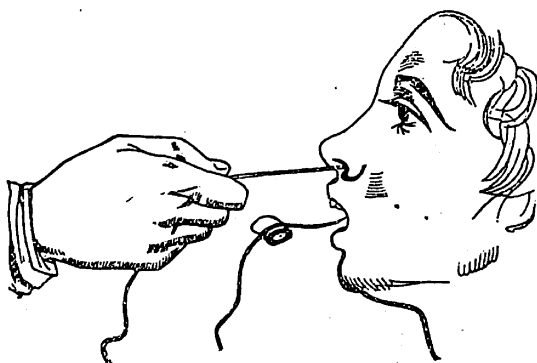
Xylo-Styptic Ether Spray.—This agent, recently brought to the notice of the profession by Dr. Richardson, consists of a solution of absolute ether, charged to saturation at a low temperature with tannin, and afterward with xyloidine. It is applied to the bleeding part by directing the fluid in a very fine spray, by means of the same instrument employed for inducing local anæsthesia, as described on page 146. The styptic character of the compound was first tested by dispersing it over a mass of defibrinated blood, which became completely solidified in five seconds; while in its application to blood recently drawn and containing its fibrin, the coagulation occurred in one second. I have several times made a practical application of this novel agent with the most gratifying result; and it appears, from the experiments made by its discoverer, that it can not only be employed with the most happy effect in the case of open wounds, but also to hemorrhages of the uterus. The instantaneous action of this agent, and the comparative simplicity and readiness of its application, will undoubtedly insure its becoming of valuable service.

Cautery.—The actual cautery is so seldom resorted to that it hardly merits notice. It is employed by applying to the part a heated iron, which, however, should not be carried to even a *red heat*—otherwise an eschar will be likely to form, which, upon separating, would probably occasion secondary hemorrhage. A cautery obtained from the galvanic current has been recommended as a substitute for the hot iron, as the degree of heat can be exactly regulated to suit the case; it also presents a much less formidable appearance to the patient.

In *epistaxis*, occurring in persons of a hemorrhagic diathesis, it sometimes becomes necessary to plug the nostrils—entirely closing the anterior and posterior nares—which may be accomplished as follows: Double a piece of wire upon itself, and introduce the folded end along the floor of the nostril from before backward, until it appears in the back part of the mouth; seizing it with the fingers or a forceps, draw it out sufficiently far to enable you to pass a cord through the loop; the wire is then to be withdrawn from the nose, bringing one end of the cord with it, the other projecting from the mouth, Fig. 116; to the latter attach a pledget of lint, which is to be drawn into the posterior nares by making traction on the end of the cord passing along the floor of the nostril; then

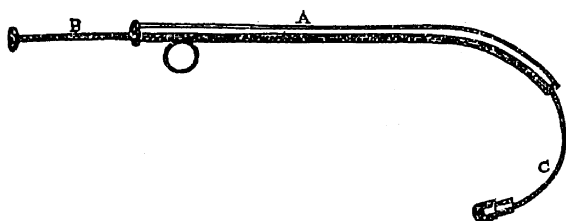
fill the anterior nares with lint, and allow the plugs to remain two or three days, according to the severity of the case.

Fig. 116.



An instrument, designed especially for this purpose, has been devised by M. Belloc, Fig. 117. It consists of a silver canula, A, resembling a small catheter; through this is passed a slender rod of

Fig. 117.



silver, B, to the extremity of which is attached a piece of watch-spring, C, that terminates in a rounded head, with a hole through it for the insertion of a cord.

To introduce it, first draw the watch-spring entirely within the canula, then pass the tube into the nostril, with its curve presenting downward, till it reaches the posterior orifice, when the watch-spring is to be pushed out into the mouth; draw the head forward and pass a cord through the hole designed to carry it; the spring is now to be redrawn into the tube, and the latter carefully removed.

SECTION I.

CLOSING OF WOUNDS.

After the completion of an operation, as well as in wounds occasioned by accident, the first question to engage the attention of the surgeon is, whether the treatment shall be conducted with a view to union by the first or second intention. There is, however, in this country, comparatively little variety of opinion respecting this point, it being almost the universal practice to attempt the healing of every incision by the process of adhesion—closing the parts by granulation being an exception to the rule.

If the character of the wound be such as to afford fair reason to expect union by adhesion, it becomes a matter of the first consequence to have all foreign matter speedily removed by aid of the forceps and the fingers, or by allowing a stream of cold water to flow gently over it. The sponge should not be applied directly to the raw surface of a wound while cleansing, unless it be absolutely required. The preliminary measures having been attended to, the sides of the wound are to be approximated as perfectly as possible, by the use of adhesive strips, collodion, sutures, or bandages, employing one or more of these means. It should also be borne in mind, in the selection of the pieces to compose the dressing, that lightness and cleanliness are of great importance, conducing very materially to a speedy reparation of the part. Provided the wound is to heal by granulation, no attempt should be immediately made to bring its lips in close apposition, as they would be likely to unite before the deeper parts or granulating surfaces would adhere, thus favoring the formation of an abscess. In cleanly-cut wounds, all the arteries requiring a ligature are seen pouring out a volume of blood corresponding with their size; but in severe contusions and lacerations, caused by an explosion of gunpowder or by machinery, it is not unfrequently the case that the largest arteries project from the ragged surface of the wound, vibrating at every pulsation of the heart, yet without bleeding in the least. They should not be neglected, however, but ligated at a point above the extremity, where their coats seem to be uninjured; otherwise, secondary hemorrhage will occur when reaction is fully established.

Sutures.—A suture is formed by stitching the edges of a wound together with lead, silver, silk, or thread. They are applied by passing the needle through the skin, or through strips of adhesive plaster which were previously placed on the margins of the wound. They are respectively named the “wet” and the “dry suture.” Of the former there are four varieties: the Interrupted, the Continued, the Quilled, and the Twisted or Hare-lip. Other kinds have been recommended, but are so seldom used (possessing little value) that a description of them will be omitted.

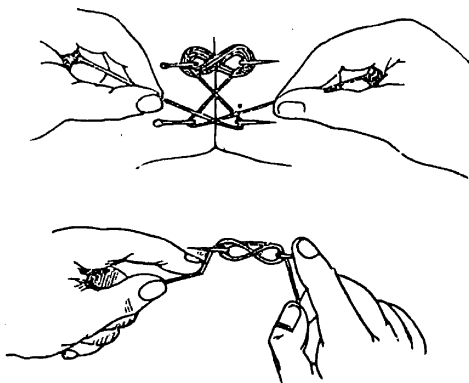
Interrupted Suture.—This should be made by the surgeon’s seizing the lip of the wound nearest to him, or the most depending portion, between the thumb and forefinger of the left hand, and then passing the needle from without inward through this edge, but from within outward through the opposite flap. The needle should not be carried deeper than the thickness of the integument, and should always be passed through the skin *perpendicularly*. Tie the ends of the thread so that the knot may rest a little to one side of the line of union, to prevent the irritation which would otherwise result should it press directly upon the approximated edges of the wound. This suture, as well as all others, should be aided by the application of adhesive strips or bandages, especially if any traction be required in closing the wound, to relieve, in a measure the strain upon the thread, and its tendency to produce ulceration. In the course of two or three days the stitches, if of silk, should be removed by seizing the knot with a forceps in order to elevate it slightly, and then cutting the thread with a pair of sharp-pointed scissors. Silk or thread sutures, if allowed to remain in more than three or four days, excite inflammation and ulceration, thereby deforming the appearance of the cicatrix. Metallic sutures create little irritation, even when left in position for weeks. In applying adhesive strips between the stitches, sufficient space should be allowed to intervene, that the discharges may readily escape in case there should be any.

The **Continued Suture** is seldom used except in wounds of the intestines, or in closing wounds made in conducting post-mortem examinations. It is the stitch commonly employed in sewing, and is sometimes called the *glover’s stitch*. The needle is passed as in making the previous suture, with the exception of crossing and recrossing the wound obliquely; whereas, in the interrupted, it is carried at right angles to the line of union.

The **Quilled Suture** is limited to those cases where the wound is very deep, the tissues being thick, as in operations or lacerations of the perinæum. In making this suture, as many needles should be armed as there are stitches to be taken. Double the thread to be employed, passing both ends through the eye of the needle; then hold the parts as before directed, and pass the needle at right angles to the line of the wound, drawing it through far enough to bring the loop made by doubling the ligature to within a short distance of the surface of the flap first pierced; proceed in like manner with each one. On removing the needle, pass a small piece of gum-elastic bougie quill or soft wood through the loops; place a similar piece on the other flap, around which are to be tied the free ends of the thread; draw the knots sufficiently firm to enable the quills to retain the surfaces of the wound in apposition. The advantage of this variety of suture is that it approximates the sides of the wound throughout its entire depth.

The **Twisted or Hare-Lip Suture** is chiefly used to promote adhesion between the edges of incised wounds, made where the parts are very moveable, as on the face, being particularly applicable after the operation for the relief of hare-lip. It is made by passing a straight pin or needle, with a rotary motion, through the lowest or free edge of the wound, and as deeply as is consistent with safety, the entrance and exit of the pin being favored by sustaining the parts with the left hand. After the necessary number of pins have been introduced, approximate the edges and pass a thread around each pin in loops resembling the figure 8, Fig. 118. The points of the pins should be removed by means of a pair of cutting-pliers, or covered with wax, to prevent them from injuring the skin. Silver pins, with moveable steel points, were at one time quite extensively used; but there is no reason to believe that they possess any marked superiority over the more common, well-

Fig. 118.



silvered pin, or the straight steel needle, recommended by Heister, or the insect pin, proposed by Dieffenbach. Dr. Dorsey, of Philadelphia, has advised the use of pieces of wire, sharpened to a point. Pins, either of silver or steel, will answer the purpose, provided they are sharp, clean, and smooth.

CHAPTER V.

DISINFECTING AGENTS.

Besides the ordinary and well-known contagious or infectious diseases, there are conditions of the system undoubtedly brought on by some atmospheric change, and which eventually become developed into affections of a specific character. This is the more especially to be noticed in large and crowded hospitals, and where the temperature of the air is exceedingly variable. Dysentery and erysipelas are particularly liable to be thus propagated; and where a large number of patients are collected together there is frequently a tendency to the occurrence of phagedæna; every sore becoming gangrenous, and new ones of like character breaking out. In order to successfully combat these atmospheric influences, recourse is had to proper ventilation and disinfectants.

The apartment occupied by the patient should be subjected to the most effective measures for frequently renewing the vitiated air by the introduction of that which is fresh and clear. When the weather is such as to admit of keeping a fire in the room, much of the noxious atmosphere will ascend through the chimney. When, however, circumstances will not admit of employing ventilation or the advantages of a fire sufficiently to answer the purpose, recourse must be had to disinfectants, or antiseptics, as a means of purification. Of the various substances used as disinfectants those containing chlorine—such as chloride of lime, potash and soda—are the most frequently resorted to, producing their neutralizing effect by an elimination of chlorine gas, which probably combines with the poisonous exhalations and effluvia, rendering them inert.

The **Chloride of Lime** may be used in a solid state by having it placed in various parts of the room, and moistened with water, or, what will give a greater decomposing power, diluted sulphuric acid.

The **Chlorides of Potash and Soda** can be rendered effective in the same manner. If, however, it be desired to use the former (chloride of lime) as a liquid, the necessary preparation can be made by introducing into a common glass retort fourteen parts of the black oxide of manganese, six parts of the chloride of soda, the same proportion of sulphuric acid, and twelve parts of water. From this combination chlorine gas will be set free without the application of heat, and is to be transmitted through a tube attached to the neck of the retort, and also to the bottom of a similar vessel filled with a saturated solution of lime. After the evolution ceases, the solution thus impregnated should be diluted with about forty parts of fresh water. This liquid is to be sprinkled on the patient's clothes and bedding, and a portion may sometimes be added in washing a diseased part.

The **Chloride of Zinc** in solution, "Burnett's disinfecting fluid," is also used; or **common salt** may be substituted by pouring concentrated sulphuric acid upon it in proportion of one part of the latter to three of salt. The objection to the use of the chlorides arises from the odor, which to some persons is very disagreeable.

The **Binoxide of Manganese**, mixed with nearly an equal amount of common salt, and then ground into a powder, becomes a very effectual agent by pouring diluted sulphuric acid upon it.

Nitrous Acid fumes, obtained by heating the nitrate of lead, or by the action of sulphuric acid on nitrate of potash, in equal proportions, has been highly recommended; though care must be exercised in the use of this compound, as well as in those previously named, lest the gas be disengaged too rapidly.

Carbon is used in a variety of forms. As *smoke*, it is sometimes employed to purify vessels or houses in which infectious diseases have prevailed. *Charcoal*, finely powdered, will often entirely correct the fetor of foul ulcers, gangrenous sores, etc., by its application as a poultice. *Coal tar*, *creosote* and *oakum* are also effective in arresting the decomposition of animal or vegetable substances.

Sulphuric Acid (oil of vitriol), owing to its power of promptly decomposing sulphuretted hydrogen and ammoniacal vapors, is undoubtedly the most effective agent for correcting the odor arising from fecal discharges.

Copperas, containing the same acid, employed in the form of a strong solution in water, is very efficient, and can be more safely handled.

Sulphurous Acid Vapor, obtained by burning sulphur or brimstone, has a marked tendency to prevent or arrest fermentation and putrefaction, and is used for the same purpose.

Sulphate of Iron, and, in short, all soluble metallic salts that possess an acid reaction, are employed with success as disinfectants.

Iodine (in tincture), for the deodorization and disinfection of fluid and semi-fluid substances, is also highly recommended.

Heat (212° Fahr.) is the only reliable agent for effecting the complete deodorization and disinfection of articles of clothing.

CHAPTER VI.

CATHETERISM.

THE term **Catheter** was formerly a very indefinite one, being extended so as to embrace instruments which were of an exploratory character, as well as those employed for the purpose of dilating closed or constricted passages. More recently, however, the almost universal custom has restricted the signification of the term to mean an open tube for evacuating the bladder or for injecting liquids.

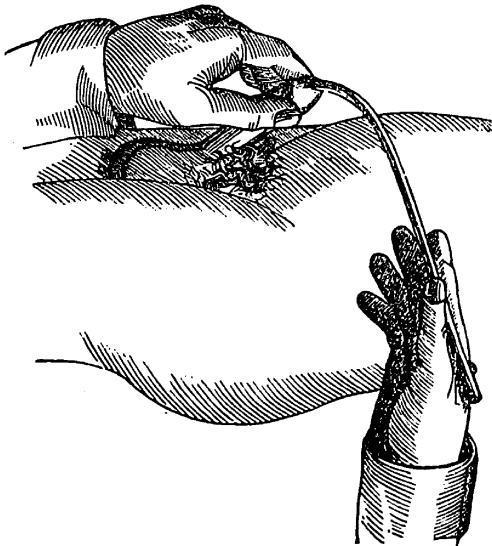
They are usually made of silver or gum-elastic. When constructed of the latter material they are necessarily destitute of fixed curve, and hence firmness is given them by introducing an iron wire along their caliber. Catheters are of different sizes, and should have two large eyes very nearly opposite each other near their curved extremity, to admit the passage of liquids; small holes are more liable to become clogged by mucus, or other causes.

The use of the catheter is appropriate when the walls of the bladder lose their tone, which is frequently the case in aged people; in cases of typhoid fever, injuries of the brain, etc., when the reflex actions are imperfect; in spasmodic or permanent stricture of the urethra; when the neck of the bladder is closed by an enlarged prostate; by pressure of the gravid uterus; in cases of obstruction from a small calculus; in rupture of the urethra; or when, from any reason, it is necessary to wash out the bladder.

Method of Introduction.—As a general rule the patient should lie on his back, with his shoulders slightly elevated, his thighs semi-flexed, and knees well apart; the surgeon, placing himself on the side of the patient, exposes the head of the penis by raising it between the middle and last two fingers of the left hand, and with the thumb and finger retracts the prepuce if required, Fig. 119; then, holding the

open end of the catheter, previously warmed and oiled, in his right hand between the thumb and first two fingers, the concavity of the instrument looking downward, he engages its point in the orifice of the canal, the direction of the tube corresponding with the line of flexure of the groin. Keeping the instrument in the same relative position, it is pressed down through the canal until it reaches the

Fig. 119.



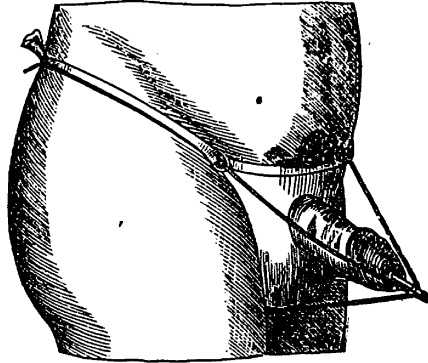
membranous portion of the urethra beneath the arch of the pubis, when the handle is to be raised, and at the same time carried toward the middle line of the abdomen; after which it should be gradually carried downward between the thighs. Its passage through the sphincter muscle at the neck of the bladder is generally indicated by a slight shiver, or tremor, or a sensation of nausea, on the part of the patient. The sudden escape of urine may be prevented by

applying the thumb over the open end of the instrument. It may be remarked, also, that a catheter of as large a diameter as the urethra will admit, can be more easily introduced than one of small size.

The French surgeons practice what they call the "*tour de maitre*," which plan may be resorted to in operating upon very fleshy persons, or when the above method has failed. The patient may be in either the lying, standing, or sitting posture; the surgeon being on the right side, passes the instrument down the urethra to the arch of the pubis, with the concavity looking downward; upon reaching this point, he gives it a turn of a half circle, so as to bring it parallel to the mesian line of the body, the concavity now looking upward; this movement, conjoined with a little pressure, generally accomplishes its entrance. There are three circumstances which determine the success of the operation: First, the resistance is overcome, the instrument slipping forward a little of itself, while its handle may be readily depressed. Secondly, the vesical extremity of the instrument can be moved in any direction by rotating the handle. Thirdly, the urine escapes, which is conclusive evidence.

In catheterism of the urethra of the female, the only difficulty is in finding the urethral orifice. This is accomplished by the surgeon's passing the forefinger of his left hand into the vulva to reach the tubercle marking the orifice, which is to be found a little below the commissure of the nymphæ. The tip of the catheter is then passed along the forefinger into the opening, the surgeon keeping the first finger of his right hand over the other end of the instrument, until the left hand is released to be employed in placing a vessel to receive the urine. In pregnant women the bladder is drawn up as the uterus becomes enlarged, so that the orifice of the urethra is found high up behind the symphysis pubis. The handle of the female catheter would therefore have to be greatly depressed in order to insert its other extremity. Under such circumstances it is more convenient to use the same instrument as for the male. When the bladder is greatly distended, the precaution should be observed never to draw off the whole of the urine at once, especially if the patient be at all debilitated, for it has occurred occasionally that fatal syncope has been the result. After withdrawing the greater portion, wait an hour or so, when the remainder may be removed. When it is desirable to retain a catheter in the urethra, a

silver one should be used, and may be secured by applying a double-T bandage around the pelvis and attaching the rings of the instrument to the strips which pass between the thighs and to the belt encircling the pelvis ; or, what is very convenient, take a ring of any material, large enough to surround the penis, and fasten to it the rings of the catheter, having the ring previously secured by a belt passing around the waist and tapes running under the perineum. A triangular piece of muslin may be substituted for the ring, having a circular opening in its center, Fig. 120. The same means, slightly modified, will serve to retain a catheter in the female urethra.

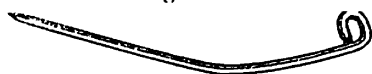


Catheterism of the Lachrymal Passages, or, more properly, their *dilatation*, is practiced for the purpose of removing obstructions to the escape of tears along their proper excretory channels. Before resorting to the operation, however, a careful examination should be instituted to ascertain whether the affection be really a closure of the natural passages which occasions the flow of tears (*stillicidium*), or simply an excessive secretion (*epiphora*). It is very essential that the operator be thoroughly acquainted with the anatomy of the parts ; for the channels along which the probe or bougie is to pass are not a little tortuous.

If the *punctæ lachrymalis* be closed, their minute orifices may first be opened with the point of a pin, or some sharp instrument, after which a probe may be introduced—the size of the latter being gradually increased until a permanent cure of the stricture has been gained, or the *lachrymal canals*, leading from the puncta to the sack, are narrowed ; in which case the probe should be introduced along these passages. To dilate the superior canal, the instrument must be passed almost perpendicularly upward, inclining a little outward, then obliquely inward and downward. In operating on the lower canal, pass the probe downward, then obliquely inward and upward.

The *nasal duct*, running from the lachrymal sack to the inferior meatus of the nostril, opening below the inferior turbinated bone, may be diminished in its caliber, and thereby occasion stillicidium lachrymarum. Various methods have been adopted to overcome the obstruction thus produced; but the most feasible is probably that by dilatation. A series of silver probes should be prepared, four or five inches long, varying in size from No. 17 wire to No. 21,

Fig. 121.



and having them slightly bent—
or straight, if preferred. One
end may be turned so as to form
a small loop, to enable the sur-

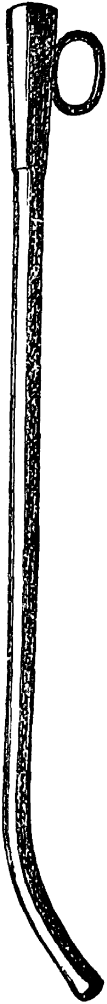
geon to handle it more easily, while the other extremity should be slightly pointed, but not sharp, Fig. 121. Pass the probe through the inferior canal, in the manner already described. When it has reached the sack, the instrument should be directed almost vertically downward until it has gained the inferior meatus of the nose. The probe should be allowed to remain an hour or more, unless severe pain ensue; and at intervals of four or five days a larger-sized probe should be used, the size being gradually increased until the stricture is entirely overcome. Haste should be avoided, and care taken to allay any undue degree of inflammation that may arise.

Catheterism of the Œsophagus.—The object of this operation is to insert a tube into the stomach for the purpose of removing fluids from this organ, or of introducing them into it. The tube employed should be of gum-elastic, about two feet in length, and furnished with a flexible stilet made of a thin strip of whalebone. The extremity which enters the stomach is closed and rounded, the fluids escaping through two large eyes, placed nearly opposite each other, at this extremity of the instrument; the other end should be open and expanded, to permit the easy insertion of a syringe-pipe. In order to introduce it, let the patient be seated if possible, his head thrown well back and supported, and his mouth kept widely opened by means of a block of wood, or something similar; the surgeon, taking his position immediately in front of the patient, guides the stomach end of the tube, previously oiled and having the stilet in its cavity, toward the posterior wall of the pharynx; the stilet should now be withdrawn, to allow the tube to curve more readily as the surgeon pushes it downward through

the pharynx and œsophagus. If the patient be conscious, the brain being in a condition to respond to impressions made upon sentient surfaces, the tube will be drawn downward to the œsophagus by the contraction of the pharyngeal muscles, thereby rendering the operation comparatively simple. The entrance of the tube into the larynx will be recognized by a spasmodic cough, or by the rushing of air through the canal. After the tube has been properly introduced, fluids may be thrown through it into the stomach by means of a common syringe, or of the stomach, prepared expressly for this purpose. Care must be exercised that the substance injected is of a proper temperature. If the object be to remove liquid matters from the stomach, a quantity of fluid should first be introduced—either tepid water or some liquid capable of neutralizing the noxious matter which may have been swallowed; after which the whole is to be withdrawn by means of the syringe, and the stomach thoroughly cleansed by repeated injections of water or mucilage. Patients who are unable to swallow, or who obstinately refuse to partake of food, may thus have nutritious liquids injected into the stomach for their support.

Catheterism of the Larynx and Trachea is rarely practiced; but in some cases of œdema of the glottis, and similar obstructions, it may, perhaps, be advisable to pass a tube into the air-passages from the mouth. The operation is more difficult of execution than catheterism of the œsophagus; sometimes, indeed, it is impossible, as when the rima glottidis is spasmodically closed. The patient being seated, or recumbent, the head should be thrown back, the mouth widely opened, and the base of the tongue depressed by means of a spoon; then the surgeon, taking a silver tube curved like the ordinary catheter for the urethra, but rather larger and open at both ends, or a stomach-tube curved by means of a stilet, passes it through the mouth directly into the larynx, the patient being directed to prolong his inspiratory act; a momentary cough may be excited by the entrance of the tube into the larynx, but this may soon subside, so that the instrument may be permitted to remain, having been secured by attaching its external end to some conveniently-placed bandage, as around the neck, for example:

Fig. 122.



Catheterism of the Eustachian Tube.—The catheter used in this operation is generally of silver, about six inches long, slightly curved at the end which enters the tube, and gradually increasing in size from this to the other extremity. It is open at both ends, and it is of very great importance that the extremity which is intended to be passed into the canal should be well rounded; otherwise, considerable irritation, and even excoriation of the lining membrane, will be produced. The instrument represented in Fig. 122 is here shown in its actual dimensions. The ring at the larger extremity of the catheter should be in the same plane as the beak of the instrument, in order that while the latter is being introduced, the operator, by looking at the ring, may know the direction of the beak. It is to be recollected that the pharyngeal orifice of the eustachian tube is situated at a distance of two inches and a few lines from the anterior orifice of the nostril of the same side, and on a line with the external wall of the inferior meatus, and being about half way between the floor of the nostril and the inferior turbinated bone.

Introduction.—The patient being seated on a chair, with his head thrown a little backward and supported on a pillow, the surgeon is to stand in front of him, and, having the instrument well oiled, passes it gently along the floor of the nostril of the same side toward the soft palate; the convexity of the catheter should be directed inward and upward, its concavity downward and outward. When the point has reached the velum palati, which will be indicated by a movement of deglutition, the shaft should be *rotated through a quarter of a circle*, so as to turn the point outward and upward to the same extent, and at the same time pushed backward a few lines, when it will have entered the expanded orifice of the tube.

CHAPTER VII.

INJECTIONS.

THIS term is applied to liquids introduced into the canals or cavities of the body by means of syringes contrived for the purpose.

Injections into the rectum are called *enema clysters* and *lavements*, and are used to unload the large intestine of its contents, and consist of, water alone, or of water holding in suspension or solution certain medicinal substances, or with the addition of a little salt, molasses, soap, or starch. Warm water, however, is generally to be preferred, though in cases of hemorrhoids or prolapsus ani cold water may be substituted for its invigorating effect, but should never be lowered below 45° F. Before using the syringe the beak should be warmed and lubricated with oil or lard; and should be introduced with great gentleness, to prevent any injury whatever to the coats of the intestine. The fluid should be forced from the tube gradually; and after all has been ejected the beak should be retained a few moments in the rectum, lest the injection pass out with it. The best instrument which has been devised is that known as Davidson's, consisting of two India-rubber tubes, attached one to either side of a hollow ball of the same material; valves are so arranged at the points of attachment that when one end of the apparatus is placed under water, and the bulb alternately squeezed and allowed to expand, the water will be drawn through and forced out at the other end. The patient will be most conveniently placed in the recumbent position.

Suppositories were formerly used as substitutes for enema, and, ordinarily, made of a piece of castile soap, cut to correspond with the form and size of the rectum, oiled, and then inserted within the sphincter muscle. It should, however, be borne in mind that a frequent resort to the administration of injections or the employment of suppositories, produces irritation of the mucous membrane lining the lower part of the rectum, and is undoubtedly in many instances

an exciting cause of the development of hemorrhoids and other organic alterations of this portion of the intestinal canal.

Injections by the Urethra are used chiefly in cases of gonorrhea. A syringe for this purpose should have a well-rounded beak, and capable of containing about half an ounce of the liquid to be employed. The syringe is to be held between the thumb and last three fingers of the right hand, the forefinger being free to push down the piston. The beak of the instrument must be inserted into the urethra with the greatest care, in order not to injure the mucous membrane; then with the thumb and one or two fingers of the left hand, compress the glands around the tube so as to prevent the immediate escape of the liquid injected. It is generally recommended that pressure be made upon the perinæum opposite the neck of the bladder, to prevent the fluid from entering this organ. This precaution is scarcely necessary provided the piston be made to descend with a proper degree of force, and only expelling sufficient fluid to fill the canal, the sphincter muscle preventing the fluid from entering the cavity of the bladder. While the injection is being administered, however, it is well for the surgeon to manipulate the urethra thoroughly by passing the finger backward and forth, thus facilitating the contact of the liquid with every portion of the mucous membrane.

Injections by the Vagina.—The vaginal syringe is usually about four inches in length and one inch in diameter, terminating in a rounded head, which is pierced by a number of holes. No especial directions are required further than stating that the instrument should be oiled and introduced well into the cavity.

CHAPTER VIII.

VACCINATION.

THE operation consists in introducing beneath the cuticle the matter of the cow-pock, and may be performed upon persons of any age. Its preservative power, however, is not absolute; and even variola itself, either spontaneous or produced by inoculation, does not invariably preserve from subsequent attacks. But, although vaccination is sometimes powerless to prevent the appearance of variola, it always diminishes the severity of the disease. This property, which Jenner and his first successors did not even suspect, is thoroughly proven by statistics which have since been accumulated. In one of the most terrible epidemics of small-pox that have taken place in Europe since the discovery of vaccination—that of Marseilles, in 1828—more than ten thousand persons were attacked. Of these, two thousand only had been vaccinated, and of that number only forty-five ($2\frac{1}{4}$ per cent.) died; whereas, one thousand five hundred ($18\frac{2}{3}$ per cent.) of the eight thousand who had not been vaccinated were carried off by the pestilence. The propriety of revaccination is also fully established. In Germany, the various governments have been induced to pay great attention to revaccination, owing to the fact that it has proved efficient in arresting the epidemics. In Wurtemberg, among forty-two thousand persons who had been revaccinated, only eight cases of varioloid occurred; whereas, one-third of the cases of variola have been manifested in persons who had been vaccinated.

In regard to the proper time of collecting the lymph, in order to obtain it in its most efficient state for propagating the disease, it may be remarked that when taken on the fifth and eighth days, inclusive, it rarely if ever fails. The younger the lymph the greater its intensity; and when obtained from a child is more to be depended upon than the lymph obtained from adults. The matter of primary vaccinations, too, is more energetic than that of secondary.

Several methods have been adopted for the preservation of vaccine matter, which is either accomplished by keeping the dry scab inclosed in wax, collodion, tin foil, or any convenient envelope, to exclude the air; or by collecting and preserving the lymph in a liquid state. This is done by puncturing the vesicle, and receiving the matter upon a plate of glass, over which a second plate is placed, and the edges then made air-tight with wax. Or capillary tubes may be employed, having a bulb at one extremity; then, by placing the open end in contact with the lymph—the air in the bulb being previously rarified by warmth and then permitted to cool—the fluid will be forced into the tube. The open extremity is now to be closed by the use of a spirit-lamp and blow-pipe. A still more convenient method of preserving the virus, and one which proves eminently successful, is to permit the lymph to dry on ivory or hard, wooden points. These should be previously made sufficiently sharp to answer the purpose of a lancet in scratching the surface. They are to be preserved air-tight. Great precaution should be exercised never to use the virus obtained from a child which presents any unhealthy phenomena, any eruption, any strumous or syphilitic taint. As a rule, the operation should be performed on the arm at a point near the insertion of the deltoid muscle. Drawing the skin tense, remove the cuticle over a minute space by scratches with a pointed instrument, just sufficient to make the blood appear, and then apply the virus. If the scab be used, a small particle should be powdered and moistened with water and applied to the abraded surface, it being allowed to dry thoroughly before the part is covered. “The local signs indicating that the vaccination has taken effect are first apparent on the third or fourth day after the operation, at which period there is a slight degree of elevation and hardness of the skin (papular stage) at the seat of the puncture, and a trifling blush of redness immediately surrounding it. On the fifth and sixth days, a small quantity of liquor sanguinis is effused beneath the epidermis, and a vesicle is formed, which is whitish or pearly in appearance, of a roundish or oval figure, and umbilicated at its center. The vesicle goes on increasing in size until the eighth or ninth day, at which period it has become fully distended, and has attained its perfect development. On the ninth day it loses its umbilicated form, it becomes flattened on the surface, and sometimes more convex than at the circumference, and is com-

posed of numerous small cells, which are filled with a limpid and transparent lymph. On the eighth day (sometimes the ninth) the perfect vesicle is surrounded by an inflamed areola, of a vivid red color (*the pearl upon the rose*), which gradually increases in extent from a few lines to more than two inches in diameter. The skin included in this areola is inflamed and tumefied, and is frequently the seat of eruption of a crop of small transparent vesicles. On the tenth day, the redness and the heat have increased; there is considerable itching in the part; the movements of the arm are somewhat painful; and the axillary glands are liable to become tender and swollen. It occasionally happens that at this period an erythematous blush spreads from the arm over the surface of the body, in irregular patches. On the eleventh day, the areola begins to diminish, the fluid contained within the vesicle has become purulent, and dessication commences at its center and proceeds gradually toward the circumference. During the succeeding days, the areola disappears more and more, the tumefaction subsides, and the vesicle dessicates into a dark-brownish crust of an irregular form. The crust, by a continuance of dessication, diminishes in size, and assumes a blackish hue. It is detached at the end of seventeen days after vaccination, and leaves upon the skin a depressed cicatrix, at the bottom of which are seen numerous small pits (*foveolæ*), which correspond with the separate cells of which the vesicle was composed. The cicatrix is permanent, enduring for the remainder of life.*

* Wilson on Skin Diseases, p. 460.

CHAPTER IX. •

REMOVAL OF FOREIGN BODIES.

From the Skin.—Needles, splinters of wood, or bits of glass or stone, etc., become occasionally imbedded in the tissues, and though usually trifling, still their extraction may sometimes be a matter of difficulty as well as of importance. Needles may frequently be removed by pressing on the adjacent skin in such a manner as to make them pierce outward, when they can be grasped with the fingers or a forceps. If, however, the manipulation does not determine the exact position of the needle, it should not be regarded advisable to cut down at hazard in hope of reaching it. Upon the discovery of irregular fragments beneath the skin—which is often only after the occurrence of suppuration—they should be at once cut down upon and extracted.

From the Eye.—The eye is very liable to become injured by the presence of foreign bodies, such as particles of iron, steel or stone, or of dust, cinders, and minute insects. If the profuse lachrymation which ensues be not sufficient to remove the offending substance, the lids should be well opened and the globe of the eye carefully examined, while the patient rolls the eye-ball in various directions; should the object be thus brought into view, it may be removed with the point of a camel's-hair pencil, by the corner of a pocket-handkerchief, a probe, or it may be necessary to use a fine forceps. If it be desired to expose the conjunctiva of the upper lid, seize the lashes and draw the lid a little off from the globe, placing a probe or some similar instrument across the lid, parallel with the cartilage; then, directing the patient to look downward, give the edge of the lid a sudden sweep upward and backward, at the same time making pressure upon the probe. Should a particle of lime get into the eye, it must, of course, be removed as quickly as possible,

and a wash of largely diluted vinegar immediately applied. The discomfort occasioned by the pressure of the irritating substance usually remains for a time after the cause has been removed; which will commonly be relieved, however, by applying tepid or cold water to the lids.

From the Nostril.—These cases are quite peculiar to children, who frequently thrust such articles as beans, peas, coffee grains, buttons, and the like, into their nose by way of amusement. Unless the manipulation be conducted with great care, the lining membrane becomes swollen in consequence of the pressure and irritation occasioned by the efforts to dislodge them; the blood flows more freely, and the passage becomes additionally occluded by clots of blood. If the object can not be seen, and readily removed with a forceps, it is well to syringe the nose to wash out the coagula and inspissated mucus which fill the cavity. The foreign substance might also be loosened, unless it should consist of beans or something of the kind which would swell by being brought in contact with the warm water; or it may be necessary to employ a flattened probe, slightly curved, which may sometimes be passed beyond the object in order to drag the latter downward; or the substance may be caught in the noose of a wire-armed canula. Inducing violent sneezing—the other nostril being closed—by administering a sternutatory, will sometimes accomplish the purpose. If the children become very much frightened and unmanageable during the efforts to relieve them, and thereby expose themselves to injury by the attempts made for the extraction of the foreign substance, they should be quieted by the administration of an anæsthetic.

From the Ear.—The lining membrane of the external auditory passage, especially near the membrana tympani, is so exquisitely sensitive that great pain and irritation, sometimes convulsions, are produced by the entrance of foreign substances. No time, however, is to be lost in effecting their removal; though the attempts should be made with great delicacy, as very unpleasant consequences have resulted from carelessness and the rude handling of instruments. If the patient be a child, it is generally advisable to employ an anæsthetic. The passage should then be examined by the aid of a speculum; and if the object can be seen it can usually be removed by the use of a flattened silver probe, slightly curved, or the scoop-

shaped end of a director, a curette, or delicate forceps. The forceps devised by Toynbee will perhaps be found the most serviceable. They resemble the ordinary dissecting forceps except in being longer and very narrow, and bent at nearly a right angle immediately below the middle, so that the operator's hand may not obstruct his view. In most cases, however, more can be accomplished by means of a syringe and tepid water than by any other means, and with less danger of injuring the patient. This is particularly true if an insect has found its way into the meatus, or if the passage be impacted with wax.

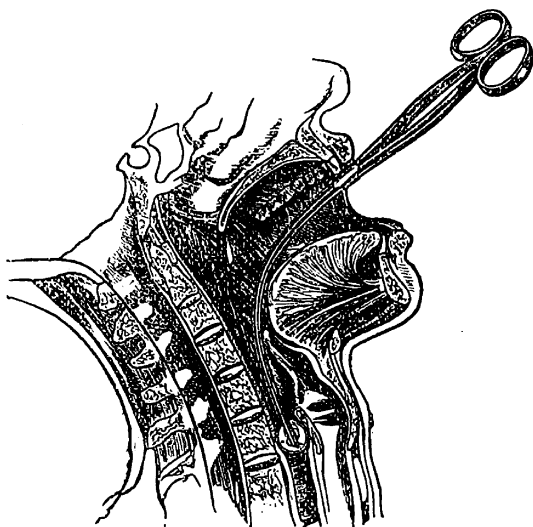
From the Pharynx and Œsophagus.—Improperly-masticated food may be arrested in its passage to the stomach, which frequently happens in paralytic persons and in lunatics, and is, hence, a common accident in insane hospitals; also, during the administration of an anæsthetic, food may be ejected from the stomach and lodge in the œsophagus or pharynx. Small objects, such as pins, buttons, fish-bones, etc., usually become obstructed in the folds and pouches at the base of the tongue and palate, causing uneasiness and constant coughing rather than actual strangling; while bodies of larger size are caught at the most constricted part of the pharynx, and by their pressure upon the larynx, or by the spasmodic irritation which they produce in the latter, endanger suffocation. The exact point of lodgement is the first thing to be ascertained, and which can usually be done by opening the patient's mouth widely, and making a careful exploration with the forefinger. If the surgeon be not able to remove it with his finger, he should make use of a dressing forceps; or, should the body be too low down to enable him to reach it with his finger, its situation may be learned by sounding with a probang, Fig. 124, a flexible rod of smooth

Fig. 124.



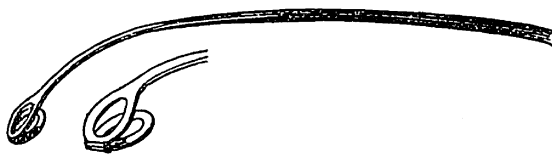
whalebone, tipped with a sponge or rounded block of ivory, and then efforts should be made to grasp it with the gullet forceps, as represented in Fig. 125.

Fig. 125.



Dr. Bond, of Philadelphia, has contrived a very simple hook, Fig. 126, which will be found a most efficient instrument. It is made of silvered wire, long enough to reach even to the stomach, and sufficiently flexible to be molded into any shape. Having a piece of wire of the proper length, double it through the middle and twist its free ends together; the looped extremity is then to

Fig. 126.



be bent at quite an acute angle with the shaft; it is thus capable of engaging small objects, as a pin or fish-bone. If, however, the object can not be withdrawn, efforts should be made to force it into the stomach by employing a probang. Should the attempt prove unsuccessful, and the symptoms be urgent, nothing remains but to resort to œsophagotomy.

From the Larynx and Trachea.—Foreign bodies, such as pieces of money, cherry and plum stones, grains of coffee, corn, etc., are

liable to be drawn into the larynx or trachea during a fit of crying, laughing, coughing, or the like, and become exceedingly difficult of removal, owing to the spasmodic closure of the glottis, which the presence of an irritant almost necessarily induces. The symptoms produced by the offending substance vary according to its position. If it be fixed in the rima glottidis, asphyxia is rapidly produced, and speedy loss of consciousness, followed by death, unless prompt relief be afforded by surgical interference. Should it be movable in the larynx and trachea, its motion will occasion violent spasmodic cough, continuing until complete exhaustion is produced. In other cases, the cough becomes less constant and violent, resembling the paroxysms of whooping-cough; or it may be similar to the cough attending an ordinary catarrh or pneumonia, so that it may even be mistaken for either of these; the character of the expectoration is also very similar. Auscultation will, however, enable the surgeon to detect the difference, from the fact that the impacted body almost always produces local pneumonia, or collapse of that portion of the pulmonary structure which is connected with the bronchial tube thus occluded. Frequently, too, the presence of a foreign body may be recognized by feeling it with the finger placed on the outside of the passage. Besides the local symptoms which attend an accident of this character, the general condition of the patient suffers: he becomes emaciated, feverish, and, indeed, presents many of the symptoms peculiar to tuberculous disease of the lungs.

Before resorting to mechanical interference, the surgeon should satisfy himself, by careful investigation into the history as well as the present phenomena of the case, that a body has really passed into the respiratory canal, and that the symptoms are not due to inflammation consequent on other causes, but to the impaction of an intruder in the pharynx or œsophagus. Provided the holding of the patient with his head downward, and slapping him on the back, do not aid the expulsive efforts of nature sufficiently to remove the substance, nothing further can be done than to decide between performing tracheotomy and laryngotomy, and then proceed at once to the operation.

From the Urethra.—The urethra of both sexes is liable to be blocked up by the lodgment therein of fragments of calculi, portions of catheters or bougies which have been broken during operations, or by foreign bodies introduced from malicious or otherwise improper

motives. The prominent symptoms are, more or less complete retention of urine, local inflammation, and pain. If the precise point of obstruction can not be ascertained by manipulation with the finger, a bougie or catheter is to be employed. To effect a removal of the body, the simplest expedient is to introduce a large-sized bougie down to it, hoping that the expulsive power of the bladder upon the accumulated urine may free the canal thus dilated, when the instrument is withdrawn.

Urethral forceps, jointed curettes, etc., have been proposed for grasping the body. Should all other means prove fruitless, an incision is to be made and the object extracted through the opening. The latter proceeding will rarely be required in case of the female urethra, owing to its straightness, shortness, and capacity for dilatation.

From the Vagina.—Cases of this kind sometimes require much judgment and mechanical skill, though usually foreign objects can be removed without difficulty by exercising patience and gentleness, together with a free use of olive oil. Though the passage is capable of great dilatation, still there is much danger of injuring the mucous membranes. No instruments should be introduced unless guided by the finger or watched by means of a speculum.

CHAPTER X.

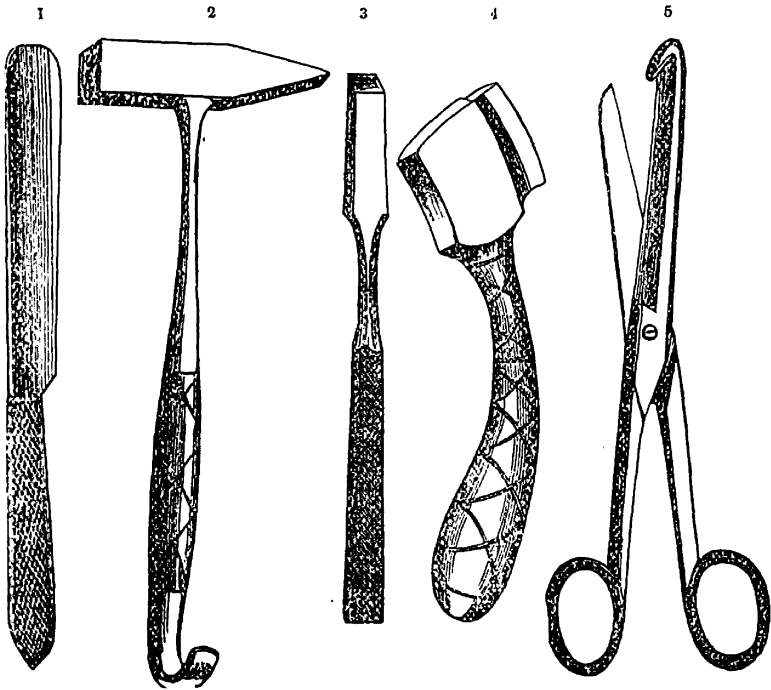
POST-MORTEM EXAMINATIONS.

THE valuable contributions to pathological science, exhibiting the practical knowledge derived from carefully and well-conducted autopsies, attest the importance of the operation and the advantages to accrue by their frequent repetition. In order, however, that an examination of this character should lose none of its value, it is required that it be made with the greatest accuracy—the surgeon having a thorough knowledge of all the particulars likely to exercise the least practical bearing upon the case undergoing investigation. Thus, he should collect a statement of all the symptoms presented during the progress of the disease—also taking into account the age

of the patient, his temperament, the degree of muscular development, mode of life, emaciation, the length of time since death; at the same time noting all external injuries, as wounds, bruises, and the like. Still, it is to be remarked that, in conducting autopsies, much will necessarily depend on the skill and experience of the operator; and hence, a few general directions are deemed sufficient, the more minute details of the examination being left to the ingenuity of the surgeon.

The Instruments Required include three or four scalpels, a cartilage-knife, a "brain-knife," a pair of dissecting forceps, a saw, hammer, chisel, rachitome, enterotome, scissors, needles, and thread. The *scalpels* should be of medium size, such as are employed in ordi-

Fig. 127.



nary dissecting, one of them having a probe point. The *cartilage-knife* should be strong and heavy, the handle being of iron or steel. The "*brain-knife*," No. 1, Fig. 127, used for slicing the brain, should be nine or ten inches in length by one inch and a half in width, round at the point, thin, but not very sharp. The *saw* is

the same as that used in ordinary amputations, with the exception of having a shoulder to prevent its cutting too deep. The *hammer*, No. 2, is provided with an iron handle, curved at its extremity, while the upper portion of the head of the instrument is wedge-shaped. The *chisel*, No. 3, used to remove portions of bone, has a narrow edge, and is strong and straight, having a short steel handle. The *rachitome*, No. 4, consists of steel, has a heavy, slightly-curved handle, the head having a blunt edge on the side corresponding with the convexity of the curve. It is employed to break the laminae of the vertebrae in order to expose the spinal cord, which is accomplished by placing the edge against the bone and striking the head of the instrument with the hammer. The *enterotome*, No. 5, is a pair of scissors employed in cutting open the intestinal tube. It is made with one of its blades a little longer than the other, which is furnished with a blunt hook at its extremity, that is inserted into the gut. By this means the blade is prevented from slipping out at each successive cut. The *needles* used to sew up the incisions made, differ from the ordinary needles employed by the surgeon, in being very large and roughened in the shank, to prevent the fingers from slipping.

The Order to be Observed in prosecuting the examination will of course depend somewhat upon the organs affected. Provided, however, the **brain** is to be inspected, it should be exposed first of all, in view of the fact that the cerebral vessels are liable to become emptied of their contents immediately after the atmospheric pressure is removed, which is effected so soon as the other cavities of the body are opened. To remove the "skull-cap," first part the hair over the summit of the head from ear to ear, after which divide the integuments in the same line, reflecting the skin over the occiput and the forehead, carrying the flap in front as far as the edge of the hair. The soft parts should now be divided with a sweep of the scalpel, and the skull sawn through in the dotted line shown in Fig. 128, and the "cap" pried up with the chisel. Dividing the dura mater, the brain is to be removed by passing the hand under the anterior cerebral lobes, in order to raise this portion of the organ, while, with

Fig. 128.



the knife in the other hand, the optic and other nerves, together with the tentorium and spinal cord, are to be divided, when the brain can be gently turned out from its cavity. The peculiar appearance of its surface is then to be observed; after which its internal structure may be examined by slicing it carefully with the brain-knife. As much as possible of it should then be replaced, and the calvaria put in position and fastened by sewing the divided portions of the temporal fascia together. The flaps of integument are next brought into apposition and sewed by the continued suture.

The **Spinal Cord** is examined by placing the body on its face, then making an incision in the line of the vertebral column and turning the flaps each way from the spinous processes; the laminae are then to be broken by the use of the rachitome and hammer, and the arch of the vertebræ removed; after which a few strokes with the scalpel will expose the dura mater.

The **Orbit** is examined by first removing the skull-cap, after which the orbital plate of the frontal bone is to be chiseled away. The **Eye-ball** is thus exposed also; or it may be extirpated in the ordinary manner, by passing a ligature through it, making it tense, and severing its attachments by a sweep of the knife.

The **Thoracic and Abdominal Viscera** should be removed in a body, previously ascertaining whether there exist any abnormal adhesions to the parietes of the surrounding walls. An incision is to be made along the mesian line, extending from the interclavicular notch to the pubes, avoiding the umbilicus by making a slight curve. The tissues are then to be dissected from the sternum and costal cartilages, and the latter severed at their point of attachment with the ribs, also carrying the knife transversely across the chest to divide the soft parts adhering to the lower cartilages. The "breast-plate" may then be lifted by dissecting away the loose areolar tissue from its under side. A transverse incision should now be made, to extend each way from the umbilicus, and the flaps of tissue thus formed turned back, when the thoracic and abdominal organs will be exposed *in situ*. The condition of the pleural cavities is next to be ascertained as regards the amount of fluid present, the extent of the adhesions contracted, and the like; after which, the hand is to be carried around the lungs, to free them from whatever attachments that may exist. Incisions may also be made

through their lobes, in order to determine the morbid changes that have occurred within their internal structure. Dividing the trachea and œsophagus, together with the large vessels at the base of the neck, the whole mass of viscera are gradually lifted out, the dissection being carried down the spine, the diaphragm being severed from its costal attachment, and a ligature placed around the rectum before the entire contents of the cavities are displaced. The liver, kidneys, pancreas, and spleen, are examined by making sections into them in various directions, while the cavities of the **Heart** are to be opened as follows: 1. Carry an incision from the orifice of one vena cava to the other through the anterior portion of the organ, which will open the cavity of the *right auricle*; this cut should then be conducted through the *right auricular appendage*. 2. Pass the forefinger into the *right ventricle* and carry the knife through its anterior wall parallel with the interventricular septum; make a second incision at an acute angle with the former, thus making a triangular flap in the anterior wall, by means of which the cavity will be entirely exposed. 3. Now pass the finger upward into the pulmonary artery, dividing it a short distance; after which the left auricle and ventricle may be opened in a similar manner described for opening the right side of the organ.

The **Stomach** is examined by making an incision along its lesser curvature; the **Bladder**, by opening it from before backward. After returning the viscera, some absorbent material, as bran, cotton, or tow, should also be introduced into the cavity to absorb the liquids which may have been poured out. The "breast-plate" should now be replaced, and the incisions sewed up by the continued suture. During the entire operation, if conducted in the presence of the friends, much care should be taken not to soil the clothes or furniture, or in any manner disfigure the face of the subject.

PART III.

INFLAMMATION, AND THE DISEASES ARISING OUT OF THE INFLAMMATORY PROCESS.

CHAPTER I.

THE INFLAMMATORY PROCESS.

SECTION I.

INFLAMMATION.

INFLAMMATION, the parent of a larger proportion of evils to which the human family is liable, may be defined, in a medical and surgical sense, to be "an alteration in the healthy structure and function of a part, accompanied by a perverted condition of the blood and capillary blood-vessels, ordinarily attended with *redness*, *pain*, *heat*, and *swelling*, and inducing more or less febrile disturbance of the general system."

This term has been made, improperly so, to include too wide a range of action—from the slightest exaltation of what is healthy to the most disastrous results of ravaging disease; rendering the cause of simple effusion one and the same with that of suppuration, ulceration, and gangrene; uniting as if in one harmonious operation the healing of a wound with its gaping and suppuration—the enlargement of a part with its destruction and discharge—the death of a portion of bone with the formation of its substitute—the successful reunion of a broken limb with the suppurative arrest and undoing of the callus—the infliction of an ulcer with its process of healing; all, however dissimilar, declared the offspring of one common parent—*Inflammation*.

I shall limit the term *inflammation*, however, to that abnormal condition of the organism that conduces to the formation of a morbid product, and which is entirely at variance with healthy func-

tion and structure. Thus, the blush of shame, or the red spot of hectic, is very different from the intense excitement and diffusible redness of erysipelas; the increase of nutritive action in the mamma is widely dissimilar from that morbid excitement which arrests healthy secretion and produces organic change in the structure; the slight turgescence that closes the lips of a simple incision is not the same process that causes the gaping wound and disintegration of its tissues. The one is not in antagonism with health, while the other is destructive of the organism, or inflammation. It is now pretty generally conceded that inflammation, properly so called, "consists in an engorgement of the capillary vessels, dependent upon their diminished action and the relaxed condition of their coats, together with more or less accelerated motion of the heart and arteries;" and in consequence thereof, or as a necessary result of such derangement, arise the well-known phenomena, *pain, heat, redness, and swelling*.

By the Romans, the expression was used to denote the heat that usually attended this condition—*in*, within, and *flamma*, a flame; while the Greeks designated the same state by the word *phlogosis*; having especial reference to the *burning* character of the pain that accompanies it; hence, the remedies used for preventing or diminishing inflammatory action were termed *antiphlogistics*, which expression is still retained in the nomenclature of the allopathic school of medicine.

It has often been disputed whether inflammation is caused by *increase* or *diminution* of vital energy in the part—an *excitement* or a *debility*; and both extremes have been tenaciously held and ably discussed by their respective advocates. I am inclined to the opinion that these differences in belief are based upon the different stages in which this process is viewed. For instance, let us take a common surgical example, as the application of an escharotic, or some acrid substance, to the skin. There present themselves, in the inflammatory process thus established, *three* distinct and well-defined stages: 1. *Simple vascular excitement*. 2. *Active congestion*. 3. *True inflammation*. Each component texture of this part may be affected so soon as brought into contact with the irritant; yet it is not improbable that one texture may be involved more decidedly than the others. This one is the nervous system; hence, immediate pain is experienced by the effect of the irritant upon its

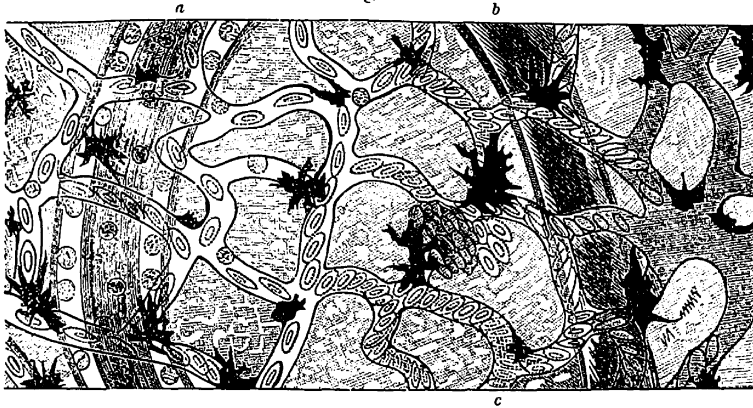
sensory portion. An impression is thus conveyed from the part to the nervous centers; thence follows a stimulus to the vascular tissue of the part already aroused by the direct influence of the irritant. This stimulus is in due time obeyed. The time which elapses between the application of the exciting cause and the establishment of the vascular action induced thereby is called the *period of incubation*. This period varies in point of time; in some cases it is brief, in others protracted, and depends upon two causes—the *force* and *extent* of the impression, and the *susceptibility* of the person to such impression.

1. **Vascular Excitement.**—This process begins with a *determination of blood* to the part, which is directed through it with augmented velocity. At first, the capillaries and minute arteries, the vessels mainly engaged in the change, are of *diminished* caliber—a vital change which may result from an inherent contractility in their walls, the capillary coats being considered of the same nature as involuntary muscular tissue. This contraction may be considered analogous to *spasm*, while the dilatation which succeeds may be likened *first* to *relaxation*, and afterwards to *paralysis*. But soon this spasm, or increase of tonicity, passes off; these vessels will then gradually yield to the increasing pressure against their sides, while the rapidity of the blood is not sensibly diminished. In a short time, the spasm has not only disappeared and the accustomed capacity been regained, but actual *dilatation* has taken place, and the diameter of the vessels has increased beyond their normal standard. Capillaries which previously contained but single files of the red corpuscles now admit of them flowing through in masses, and continually crowding onward. In consequence of this abnormal process, vessels which were before invisible now become sensible to sight, and the accelerated motion of the general current is as yet but little abated. As dilatation increases, however, the onward flow of blood becomes more and more retarded. In this condition of the part we find a tendency to unusual transudation; in other words, along with this increased circulation there is an increase of the ordinary function of the circulation. The blood becomes changed in quality, and parts with a portion of its constituent particles more freely than in quiet health. This transudation may be chiefly serous; or the liquor sanguinis is found on open surfaces, and in interstitial

spaces. The natural function of the part is exalted, and a degree of hyperæsthesia is produced. If this be secretion, the secreted fluid is increased in quantity, its natural characteristics undergoing little or no change.

Nutrition is also exalted, and the fibro-areolar tissue is fuller than before, producing increase of bulk, or swelling. This is the first stage, or that of *simple vascular excitement*, not necessarily inconsistent with health, but rather an exaltation of the vitality of

Fig. 129.



An exact copy of a portion of the web in the foot of a young frog, after a drop of strong alcohol had been placed upon it. The view exhibits a deep-seated artery and vein, somewhat out of focus; the intermediate or capillary plexus running over them, and pigment cells of various sizes scattered over the whole. On the left of the figure, the circulation is still active and natural. About the middle, it is more slow, the column of blood is oscillating, and the corpuscles crowded together. On the right, congestion, followed by exudation, has taken place, constituting inflammatory action in the part.

a. A deep-seated vein, partially out of focus. The current of blood is of a deeper color and not so rapid as that in the artery. It is running in the opposite direction. The lymph space on each side, filled with slightly yellowish blood plasma, is very apparent, containing a number of colorless corpuscles, clinging to or slowly moving along the sides of the vessel.

b. A deep-seated artery, out of focus, the rapid current of blood allowing nothing to be perceived but a reddish-yellow broad streak, with lighter spaces at the sides.

Opposite c, laceration of a capillary vessel has produced an extravasation of blood, which resembled a brownish-red spot.

At d, congestion has occurred, and the blood corpuscles are apparently merged into one semi-transparent, reddish mass, entirely filling the vessels. The spaces of the web between the capillaries are rendered thicker and less transparent, partly by the action of the alcohol partly by the exudation. This latter entirely fills up the spaces, or only coats the vessel.—BENNETT.

the part. This is a condition corresponding with the *vital turbulence* of some physiologists—the prominent indications being, an *increased amount of blood* to the part; an *active circulation*;

a *tendency to increased exudation*, partly *serous*, and partly of a *plastic* nature. The exciting cause now being removed, this condition may soon subside, and the part regains its normal characteristics; or, the exciting cause remaining, the disturbance is sustained, yet without proceeding to a higher grade, succeeded by a salutary result. For instance: If a particle of sand comes in contact with the conjunctiva, there is produced simple exaltation of function, which is followed by an increased serous effusion, the particle of sand being washed away, so to speak, by the excess of tears. But if the exciting cause continues, or is more severe in its character, though of brief application, there is neither abatement nor simple maintenance of the changed condition. Here another process is set up, which runs in the *second stage*.

2. Active Congestion.—The commotion in the vascular system extends on the cardiac side of the affected part; the arterial vessels supplying the part becoming interested in the excitement, they begin to enlarge and pulsate with increased energy; a continual and increased supply of blood flows to the part, and the capillaries and minute arteries begin to fail in consequence of their increased burden. In the first stage of *vascular excitement*, these vessels were simply dilated, yet apparently controlling the circulation of their contents; but now the tonicity of their coats is giving way, and enlargement is about to be merged into over-distention. Partly from this cause; partly on account of change in the blood itself, which seems more viscid with its corpuscles less distinct; and partly, also, from an increase of vital attraction between the blood and surrounding parenchyma—the circulation loses its acquired rapidity, and becomes slower even than in health. The red corpuscles no longer occupy the center of the channel, but encroach more and more on the lateral and clear “lymph spaces.” In health, the nutrient matter transudes through the capillary coats in quantity sufficient to supply pabulum for the tissue. But when a pathological irritation ensues, a larger quantity of material transudes than can be appropriated by the tissues; and not only is this material increased in amount, but it becomes changed in its character and unfit for nutrition. As the coats become more and more relaxed, and finally lose their power to contract, the quantity transuding correspondingly increases. The total of the fluid which transudes in inflammation is termed *liquor sanguinis*, and is composed of serum and

fibrin. The fibrin of this compound is altered in its character; it differs from natural fibrin in being more highly vitalized; it has degenerated from nutrient material, but it constitutes a higher type of fibrin than that which exists ordinarily in the blood. Derived from elements which have been elaborated for nutrition, and suddenly exposed to conditions which caused an early degeneration, there results a higher degree of vitality, which is so essential to a speedy restoration of the diseased part. The fibrin is more plastic than natural, with a greater tendency to become organized. The natural function of the part is not simply exalted; it has gone on one step further: it is perverted—the secretion being not only increased, but changed in its character. The texture of the part is softened and enlarged by the deposit of fibrinous material, and the supply of plastic material is greater than can be usefully and normally appropriated by the implicated tissues. The “formative power” is disordered; *nutrition*, or the normal and vital relation which subsists between the living tissue and nutrient materials contained in the blood, is becoming more and more disturbed. This constitutes, perhaps, the most important part of the inflammatory process, leading ultimately to change of structure, more or less permanent, and more or less inimical to resumption or continuance of normal function. This is the second stage of the inflammatory process. The arterial vessels have their activity increased, but the circulation of the part is diminished; the vessels are over-distended, their tonicity is impaired; the blood undergoes change; the fibrin is increased both in quantity and plasticity; exudation of liquor sanguinis takes place more or less copiously, and the offices of function and nutrition are perverted; the part is leaving the confines of health, and has already made some progress into the domain of disease. This action, after the removal of the exciting cause, may yet be resolved into a state of health, or it may be sustained for some time, as in the healing of wounds or the closing of ulcers; or it may advance to the third stage.

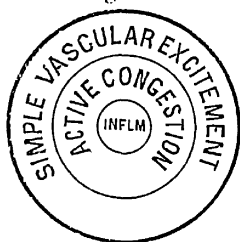
3. True Inflammation.—The change which in the preceding stages had begun in the blood is now completed. The over-distention of the capillaries is established; the capillary power is temporarily lost, perhaps in consequence of *diminution* or *actual suspension* of their nervous influence; and the coats of the capillaries and other vessels are spongy, softened, and impaired in cohesion,

being themselves the subjects of structural change. The languor of circulation approaches stagnation, and at certain points this actually occurs. Every part of the distended capillaries is occupied by crowded, colored, and colorless corpuscles; the perverted liquor sanguinis is exuded in profusion. The attenuated and softened capillaries also give way in their coats; and from the lesion, blood is extravasated in mass. Suppuration is about to take place by extravascular degeneration of the fibrinous exudation; the parenchymatous structure softens and is broken up by the effused pus and blood, and the disintegrated texture becomes mixed with the contents escaped from the vessels. The formative power has ceased, vitality is diminished, and we now have the opposite condition of health, or tendency to disintegration. Functional disorder is complete, secretion being in the first place arrested; and when restored, becomes more vitiated than before. In the circulation of the part truly inflamed, all is sluggishness and stagnation, but that of the parts around is unusually active. The arterial vessels in the vicinity are endowed with increased activity; blood continues to be sent forward through the efferent channels, but meets with an obstruction in the inflamed part, and can not be transmitted in its direct course, but takes a circuitous route, imposing additional labor on the collateral vessels; these, however, retain sufficient vigor for their augmented duties, and pass the current briskly round. These vessels, by over-taxation, may become involved in the morbid process, and thus the course of circulation, at such extension, may be rendered more and more circuitous. While deposition is thus continually going on, the process of absorption is in abeyance. During inflammation the lymphatics and minute veins do either little or nothing as absorbents; on yielding of the disease, however, not only does effusion begin to abate, but absorption again comes into play quite actively; and through this process the part is nearly, if not entirely, restored to its natural state. In inflammation of serous tissues, for instance, a large amount of liquid effusion often rapidly accumulates within its cavity. So long as the disease persists, the fluid either remains stationary or increases in volume; but as soon as the inflammatory process has subsided, and resolution is in progress, the effusion gradually diminishes, and in a short time, under favorable circumstances, it entirely disappears. Let us examine for a few moments

this inflammatory change that takes place in the blood. 1. The liquor sanguinis is increased in relative quantity, and its serum is said to contain an unusual amount of albumen. 2. The fibrin is increased in quantity, both actually and relatively, to the red corpuscles; the proportion of serum is diminished, probably in consequence of effusion. 3. The red corpuscles are relatively diminished in number, and their tendency to aggregation is augmented. 4. The colorless or "lymph" globules seem to be frequently increased in numbers; but this change is by no means essentially connected with the inflammatory process, as some have supposed. This alteration of the blood, begun in the second, or stage of active congestion, and completed in the third, or true inflammatory stage, is at first a local act, effected in the part inflamed; but this diseased process, if continued thus in operation, may ultimately involve the whole circulating fluid in this morbid derangement. These are the peculiar characteristics of true inflammation: 1. *Blood much altered, stagnant, or a tendency to stagnation.* 2. *The capillaries over-distended; passive tubes—their coats spongy, soft, and easily lacerated.* 3. *The neighboring collateral circulation* is unusually active. 4. *Copious exudation* of liquor sanguinis. 5. *Extravasation* of blood by lesion of the capillary coats. 6. *Absorption* in abeyance. 7. Nutrition and function wholly perverted. 8. *Structure* changed; texture softened and enlarged. 9. *Suppuration* in progress, and part of the texture breaking up. In fact, there is nothing presented that is healthy, or consistent with the integrity of the part; all is essentially disease. This state of disease is not established at once, but is approached by a process of transition more or less gradual. The previous stages may be either short or protracted, but must have existed in some form or other. When the process has been rapid, its succeeding stages may have been so blended that we could only discern the beginning and the end; but when the process is more tardy, its compound nature is more distinct. Let me take, for example, a familiar illustration which you have all seen—the vaccine pustule. Here is presented an inflammation resulting from a poisoned wound, and gradually attaining to its consummation. Apply the virus under the skin; at first it seems inoperative; three days or more elapse before the appearance of vascular excitement. This period of time is called

the period of incubation. On the fourth day, or later, the papular condition is established, commencing with the first stage, *simple* or *vascular excitement*; and gradually, day by day, verging toward *active congestion*. During the four following days the vesicle is formed—the result of the *second* stage, or that of *active congestion*; the vesicle containing a clear, limpid fluid, which afterwards becomes of a more glutinous character by exudation of the liquor sanguinis. On the ninth day, the *pustular* formation is attained; and then, and not until then, has the establishment of *true inflammation*, or the third stage, been completed. Soon after this, vascular action generally subsides, and the part slowly recovers. During the morbid process, advance-

Fig. 130.



ment begins at the center and stretches toward the circumference. Let us suppose that we have a section made of the inflammatory disk, and the accompanying diagram will represent the state of the part. The outer circle will represent *simple vascular excitement*, whose characteristic effusion is serous. The second will represent *active congestion*, with exuda-

tion of plastic liquor sanguinis; within the inner circle, *true inflammation* is denoted by more or less extravasation and destruction of texture, and the formation of pus in progress. Thus, *true inflammation*, structurally considered, consists of suppuration, actual or threatening, surrounded by fibrinous deposit, and that encircled by effusion of serum. Every day's experience of the practitioner illustrates the inflammatory process. In the detection of deep abscesses, for instance, the subcutaneous areola tissue is found œdematous; beneath this a firm hardness is felt, showing that the second stage of *active congestion* is going on; while within, or that space corresponding with the inner circle, is the third stage, or *true inflammation*, which is the site of suppuration. Thus we may readily perceive that inflammation is caused by increase or diminution of vital strength in the part—an excitement or a debility, as we regard the extent of the inflammatory process. It is owing to these several changes that different authors have held to the opinions heretofore stated. Thus, if we view this inflammatory act as a whole, we see that there is both a tonicity of the part, or increased vascular excitement, and a

want of tonicity, or *diminished* vital effort. It is *this state* that corresponds to the flaccidity and increased flow of blood through the capillaries, producing, as I have shown you, the state of active congestion. The fact may be said to occupy a middle ground between the disputants, viewing the inflammatory process as a unit—commencing with excitement and ending with a partial or complete destruction of the part. Thus, *true inflammation*, or the *third* stage of the inflammatory process, is attended with more or less prostration of the vital power, with accompanying change of structure. The part never entirely recovers, and remains not only more susceptible to disease, but more difficult of cure when attacked. This is important for the surgeon to understand, as it becomes a valuable aid in the diagnosis and prognosis of disease. This leads me to the consideration of

THE SYMPTOMS OF INFLAMMATION,

Or that condition in which perversion of the vital action in the part affected is followed by the well-known symptoms—*redness*, *pain*, *heat*, and *swelling*, with more or less fever or constitutional disturbance. The order in which these characteristics are presented is entirely arbitrary; but the arrangement, it is thought, corresponds closely to the phenomena exhibited in the process.

1. **Rubor, or Redness.**—This symptom is owing to a dilatation of the blood-vessels; the more fully a part is injected with blood, the redder it appears. The redness varies from the slightest increase of the natural hue to the deepest scarlet, according to the character of the tissues affected and the intensity of the morbid action. It is most marked in vascular structures, and least so in organs possessing a limited number of vessels. In inflammation of the arachnoid membrane, the only evidence of disease observable after death is effusion of serum, or fibrin and serum. All evidence of vascularity is absent, and yet death has been the result of morbid action. The transition from the natural hue of the part to the discoloration of inflammation is a gradual process, keeping pace with the increasing determination, and running through the various shades, from the slightest blush to the purple or black that precedes mortification. In the first instance, the minute capillaries in health, carrying the red corpuscles in single file, are invisible to the naked

eye; but when they are inflamed, their coats are dilated by the onward rush of red globules, and become plainly visible. The discoloration varies not only in degree, but in character, and becomes an important diagnostic in determining the nature of the disease. Thus, in the throat it is scarlet, and points to scarlet fever, diphtheria, etc.; when dark red or purplish, it indicates syphilitic disease; it is grayish or brick-colored in inflammation of the iris; yellowish in bilious erysipelas; copper-colored in syphilitic diseases assuming an eruptive character; purple in irritable ulcers; and black as in mortification. When inflammation is *acute*, the redness is of a bright scarlet tint, and resembles the hue of arterial blood; when chronic, it is of a dark venous hue; and in certain specific inflammations, it is *purple* or *copper-colored*.

The *color* of an inflamed part is usually modified by the circumstance that the disturbed vessels give way, producing extravasation into the intervascular tissues. The rusty sputa of pneumonia is a familiar illustration of the effect of extravasation into the parenchymatous structure of the lungs. In common inflammation, the redness is gradually diffused and lost in the neighboring parts, while in some forms of specific inflammation it is abruptly circumscribed. The *extent* and *form* of redness vary: sometimes it is limited to a single spot, as in the pustule or phlegmon; sometimes it extends over a large space, occupying an unbroken sheet, as in erysipelas; sometimes gradually lost by diffusion in the surrounding normal hue, as in phlegmon; sometimes carrying an abrupt, bright margin, as in the erratic erythema. One of the most important characters of inflammatory redness is its slight liability to *sudden* remission or exacerbation. Other redness may come and go, as the blush of shame or the glow of warmth, but that of inflammation is fixed. By pressure of the finger it may be made to disappear momentarily, but returns as soon as the pressure is taken off. The patient may be bled to syncope, and the general surface grow pale as marble, but this will not yet blanch the inflamed part; its redness remains until the disease which caused it shall have passed away. But not only has it no fitting tendency, it must be conjoined with other symptoms. A crimson spot on the hectic cheek is sometimes fixed there with little or no alteration, but there is neither pain nor swelling; it is not conjoined with other signs; it is not inflammatory. There are several terms used by practitioners to designate

the *variety*, *degree*, and *appearances* of redness: 1. It is called *ramiform* when seated in the small arteries and veins only, and not in the capillaries. 2. It is called *capilliform* when some of the capillaries are also distended. 3. It is said to be *uniform* when all the capillaries are injected, as in erysipelas. 4. It is *punctiform* when occurring in minute dots, as when the villi of a mucous membrane are injected, but not the mucous tissue itself. 5. It is called *maculiform* when the blood is extremely accumulated or also extravasated at certain points; this form of redness accompanies hemorrhagic inflammation.

2. Pain.—Of all the symptoms of the inflammatory process, this is the most characteristic. The pain of inflammation may be attributed partly to a stretching of the nerves by the distended blood-vessels, and partly to a disorder of sensation accompanying the derangement of nutrition and function. It differs in its character and intensity according to the cause producing it and the part which is affected, thus: it is *burning* and *tingling* in the skin; *sharp* and *lancinating* in the pleura; a mere sense of *heat* and *soreness* in the bronchial mucous membrane; and *extremely dull* and *oppressive* in a part supplied with ganglionic nerves, as the stomach, kidneys, or testicles. It is always less severe if the fluid products of inflammation can readily escape than if they are confined; and comparatively slight if the part inflamed be yielding and extensile; but most severe if it is hard and dense, as in bone or ligament, although these structures possess very little sensibility in health. It is also, in general, greater in common inflammation than in specific, with the exception of the gout. It is sometimes felt at a distance from the inflamed part; thus, pain in the shoulder is often the first symptom of inflamed liver; and pain in the knee, of diseased hip. Lastly, it may be entirely absent, as when inflammation occurs in a healthy constitution and merely produces adhesion. Thus, we find adhesions between the pleuræ after death that never were suspected during life. Or when inflammation, although disorganizing, is very insidious and indolent, as in scrofula; or when the patient's mental and physical sensibilities have been benumbed by the habitual use of intoxicating liquors; or when the nervous system is stupefied by the influence of poisonous blood, as in fever; or when the part inflamed is deprived of its nerves of sensation.

It is worthy of observation that pain is much more severe when

seated in the covering of an organ than when occupying the organ itself. Thus, inflammation of the pleuræ is attended with more violent distress than when the inflammation is situated in the substance of the lungs. In inflammation of the liver, structural change may take place without producing any great amount of pain; and the same phenomenon occurs when the substance of the brain is involved in the inflammatory process. But if the serous envelope of these organs be implicated, pain of an acute character will be the uniform result.

Pain may exist, however, without inflammatory action, and may be the consequence of spasm, or of simple irritation. It is distinguished from the latter by its gradual and persistent course, increased by motion and pressure, with more or less febrile disturbance and evidences of constitutional indisposition; while the latter appears suddenly, is intensely violent, intermittent, and shows no marked derangement of the system. In inflammation, pain is increased by pressure—is constant, and may become quite intolerable; while the pain of spasm is often relieved by pressure, and is paroxysmal—appearing and departing without any appreciable cause. As for example, the spasm of colic may be greatly relieved by pressure firmly laid over the abdomen, while in peritonitis the slightest movement produces intense suffering. In neuralgia—an example of irritation—the pain is severe and lancinating, darting through the parts with the rapidity of lightning. It is remittent and erratic in its course, and is accompanied by a sense of soreness or aching in the part. It may disappear as suddenly as it came, to recur at the end of a few hours, or about the same period the succeeding day, assuming the character of an intermittent, and, doubtless like the latter, having a miasmatic origin. The pain of spasm, unlike that of inflammation, is rarely dangerous; but in nervous, irritable persons, it may occasion, if severe, considerable constitutional mischief, by exhausting and depressing the vital powers. A sudden disappearance of inflammatory pain is generally indicative of danger, as it implies a loss of sensibility in the part, with death of the affected structures. For instance, a person has contracted strangulated hernia—the constriction is not overcome, the bowel is acutely inflamed, and the pain is excruciating and continuous; all of a sudden it ceases, and the sufferer imagines he will soon be well. The respite from pain is the certain precursor

of speedy dissolution; the surface is cold and clammy, the pulse scarcely perceptible, the features collapsed, and death takes place from mortification of the intestines.

Pain is not always the accompaniment of inflammation, as has been shown in fevers of an adynamic type. In pneumonia, occasionally little or no pain is experienced; and in typhoid fever, involving the glands of Peyer, and terminating in ulceration of these organs, there is generally an entire absence of this symptom from beginning to end, unless perforation of the intestine occur, and its contents escape into the peritoneal cavity. An acute abscess may take place in a paralytic limb, and the patient remain in ignorance of the fact until discovered by the surgeon in attendance. In scrofulous affections of the spine, especially the varieties known as psoas abscess and Pott's disease, pain is of exceedingly rare occurrence in the earlier stage of the inflammation. In fact, inflammation without pain is fraught with danger to life, as the real condition of disease is liable to be overlooked by the medical attendant until too late for the successful interference of his art.

Pain sometimes occurs *sympathetically*, and remote from the part where the inflammation exists. Thus, suppuration in the hip-joint may cause pain more or less severe in the region of the knee; inflammation of the internal structure of the kidney may occasion pain at the extremity of the urethra; and derangement of the liver, terminating in organic disease, pain in the shoulder. So that, depending on symptoms alone, to the exclusion of the pathological conditions that arise in such cases, practitioners will be led into errors of diagnosis that may entail the most unpleasant and sometimes serious results upon their patients.

Pain, if intense and constant, rapidly exhausts the vital powers; and hence requires, in all cases of severity, prompt and decided action for its relief. An ordinary amount of pain may be viewed as a salutary measure, denoting the integrity of the organism which is attacked, and pointing out to the practitioner the actual condition of things going on within. If inflammatory action should be always painless, both patient and practitioner might be deceived as to its existence or extent until too late to save either function, organ, or life.

How pain is produced has been the theme of much discussion. Some have contended that it is caused by a development of new

nerves ; others, that it is produced by compression of the nerves of the part by the distended vessels, and the extravasated fluids thrown out by rupture of their coats. Of the intimate nature of pain, little is known. Observation teaches us that it is a peculiar mental perception, dependent upon a healthy condition of the brain, without which it is impossible for it to occur. This is demonstrated in apoplexy, and paralysis of the inferior half of the body, in which the most violent inflammation may take place in the internal viscera and external structures without the manifestation of its existence. The brain and nerves being diseased, they are not capable of reflecting the impressions of pain.

Throbbing.—The term *throbbing* has reference to a peculiar kind of pain that denotes the approach of suppuration, or suppuration itself. It seems to be the result of obstructed circulation in the part, and does not occur, at least to any extent, until the process has reached the stage of sanguineous congestion. If an important vessel in the body is exposed, it will be seen to beat evenly and smoothly, denoting a free and natural circulation through the vessel ; but ligate this artery, and, instead of the even and gentle pulsation, an instantaneous and tumultuous movement begins on the cardiac side, the tide of blood sweeping forward forcibly to overcome the obstruction. This is the beginning of inflammation ; the collateral branches become distended with the flow of blood required for the support of parts beyond, and the sensation of *throbbing* is produced. The throbbing is slight or severe, in proportion to the increased supply of blood, the obstruction to its course, and the circuitousness of the route through which it is transmitted. Posture, therefore, exerts more or less influence upon the severity of this disturbing force, as is shown in whitlow, the hands hanging by the side of the body ; and in boils on the nates, when the person stands erect—the pain being modified in both instances when the arm or body assumes the horizontal position.

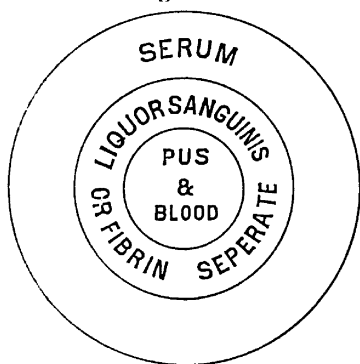
3. Heat.—This is a symptom seldom absent in inflammatory action ; nor is it devoid of prominence. And it is easy to imagine how it should be so when we remember that the source of animal heat is probably to be found in the changes effected in the blood of the capillaries—changes which, during the inflammatory process, are evidently carried on with greater rapidity and energy, though in a

perverted manner. From this cause, the temperature is necessarily elevated somewhat above its former and ordinary range, as becomes apparent to the touch. But nerves of sensation, partaking of the general disorder, have, in consequence, their functions excited and perverted. In fact, increased sensibility is one of the signs of the inflammatory process; and when with that we couple the circumstance of an unusual amount of changing blood, giving an actual elevation of temperature, we can readily understand how the patient should feel a greater heat than the thermometer would indicate. The heat of inflammation, therefore, is partly actual, as ascertained by the touch or thermometer; partly the result of perverted nervous function, estimated only by the patient. The inflammatory heat, like the redness which is so closely connected with it, is seldom very transitory; and this is an important characteristic mark. Blushing brings heat as well as color, but both are evanescent. Heat must also be conjoined with other symptoms of the perverted condition. In hectic, there is often a constant burning in the hands and feet, yet no inflammation is there. Heat is modified by the distance of the affected part from the center of the circulation. All actions, healthy as well as morbid, proceed with more vigor in the superior extremities—the head, the neck, and the trunk—than in the more remote parts of the body. It is most remarkable in inflammation of those parts which are farthest from the heart, and naturally the coldest. The heat in them does not rise so high as the mean temperature of the blood; while in inflammation of internal parts, whose heat is uniform and not depressed by external causes, it sometimes does not rise at all. Liebeg attributes increase of heat to a more rapid oxydation of the tissues of the inflamed part, assisted by the increased efflux of blood, which will of necessity produce a greater evolution of heat. In erysipelas of the skin of the trunk; in urinous infiltration of the scrotum; in acute abscess; in tonsillitis, orchitis, bubo, and other affections, says Gross, “I have again and again seen the mercury rise in the instrument above 100° , and in some instances even as high as 105° , 106° , and 107° .” It has been ascertained, says the same author, that the oviduct of a frog ready to spawn is two degrees hotter than the heart; and Prof. Dunglison has seen the temperature of the uterus during labor as high as 106° . From these and other facts which might be brought forward, if deemed

necessary, the conclusion seems to be irresistible that inflammation, in whatever part of the body it may occur, provided it is not too slight or limited in its extent, is associated with an increased elevation of temperature. Irritating applications, such as blisters, sinapisms, the strong mineral acids, spirits of ammonia, etc., when brought in contact with the body a sufficient length of time, produce the same effect, accelerating the circulation and producing an increase of temperature in the part.

4. Swelling.—An undue accumulation of blood in an inflamed part, with impaired function, gives rise to this phenomenon. It is seldom entirely absent in inflammations of the external parts of the body, but may not be associated with this process in some of the internal textures, though the morbid action may be both violent and extensive. Under this head may be included inflammations of the serous and fibrous structures—the tendons, cartilages, blood-vessels, nerves, and bones. Mucous membranes are exempt from this condition of disease, except in those positions which are freely supplied with loose cellular tissue, and which so readily favor the infiltration of fluids, such as the conjunctiva, tonsils, glottis, and labia externa. Any accumulation of blood more than normal will occasion swelling in the part inflamed; but as a symptom of the inflammatory process, swelling is mainly caused by the escape of a portion of the vascular contents into the intervascular spaces. In the *earliest* stage, the effusion is chiefly serous; in the *second*

Fig. 131.



stage, liquor sanguinis exudes, or fibrin, more or less separated from its serum—and this fibrin is of high plasticity. In the *third* stage, the fibrinous deposit is continued, but of impaired plasticity; with it is mixed blood, extravasated in mass, the result of vascular degeneration; and ultimately formation of purulent matter is more or less advanced; so that again, referring to the diagram, centrally we have a soft,

fluctuating swelling, composed of both blood and pus; surrounding this, a dense and unyielding circle, somewhat diffuse, and usually less prominent than the center, the result of plastic fibrinous accu-

mulation; and exterior to both, a soft, pitting œdema, more or less extensive, according as the areolar tissue has been filled by serus effusion. The combined result is softening of texture and impairment of cohesion, as well as enlargement of the part. Swelling, like redness, will not alone indicate inflammation; it must be conjoined with other symptoms. In simple œdema there may be much swelling, yet there is nothing of the inflammatory process. The *tendency* of swelling is beneficial or otherwise, according to the part affected. If this be internal, of delicate texture, and important in function, swelling there may prove in the highest degree injurious; as in the brain. Or a part itself, comparatively of little importance, may be in the immediate vicinity of one which is of the greatest; and enlargement of the former may react on the latter most injuriously. Swelling of the areolar tissue of the orbit will thus affect the ball of the eye; an inflammatory tumor of the submucous tissue may fatally close the glottis. On the other hand, swelling is usually a fortunate occurrence, and as such will be encouraged by the surgeon, if the part be situated externally, as in the ordinary subcutaneous areolar tissue; or if it be neither itself of delicate texture, nor endowed with function essential to the animal economy, nor closely connected with one which is either or both, as the textures occupying the intermuscular spaces. The over-distended vessels are relieved of a part of their burden; and an opportunity, varying according to the extent and rapidity of the exudation, is thus afforded them of recovering from debility, regaining their normal tone, and once more seeming to control the circulation of their contents; always provided, however, the escape from the vessels, and the yielding of the surrounding texture to receive what has escaped, advance consentaneously and in harmony. Of this favorable kind are many of the swellings in an inflamed part with which the surgeon has to deal, as in erysipelas, phlegmon, fractures, bruises, etc. It is not the invariable rule, therefore, to regard the amount of swelling as a certain index to the extent of mischief; nor ought we, in all cases of great tumescence, to deliver a gloomy prognosis. Inflammation may produce every possible alteration of secretion: 1. In *quantity*; secretion is generally diminished at the commencement of inflammation, but increased at its close, as in mucous membranes. 2. In *chemical composition*, as the tears, which in certain cases become hot and

scalding, and excoriate the cheek. 3. The secretions may be mixed with the products of inflammation, as the blood, serum, lymph, and pus. The exudation of plastic fibrin will afterward be seen to be further advantageous, as constituting a most important limit to the central suppuration when that occurs. From what has been said, it is already apparent how the tendency of swelling is prominently connected with the texture of the part; the less yielding, the less favorably disposed for exudation. The process advancing, so does the escape of the vascular contents; but should the texture refuse to accommodate this growing addition to its bulk, there arises as it were a struggle between the unloading vessels and the unyielding part, the issue of which is sure to be disastrous. It is the surgeon's office to watch this, and to either maintain or restore harmony, if possible; otherwise, pressure from the pent-up exudation reacts disadvantageously on the blood-vessels and nerves of the part; tension is soon accompanied by throbbing, heat, and violent pain; the morbid process has received a fresh impulse, and advances accordingly. Or, the tightness of pressure thus caused may be so great as to arrest altogether the circulation in the part, already inclined to stagnation—so rendering gangrene inevitable. Hence it is that rapid swelling in a loose texture tends always to relief, as in the ordinary areolar tissue; while swelling in that which is unyielding requires both constant and skillful care, and even then does injury. Acute disease, with rapid exudation in and beneath the sclerotic membrane, is comparatively harmless; while in the cornea, the result may be serious.

Alterations in Structure.—Inflammation is capable of changing all the mechanical qualities of parts. First—The weight of the part is always increased if the inflammation be recent, or if it has not existed long enough to induce atrophy. Second—*Cohesion* or *hardness* is always diminished in acute inflammation; although this is apt to be overlooked in consequence of the increased density. This softening arises from the effusions which infiltrate the tissues. When the inflammation is chronic, hardness may be increased from the shrunken bulk of the part, and by the organization of lymph. This hardening was formerly called *schirrus*, and the term is still maintained by French surgeons in this sense; but it is more appropriate to use it as designating a definite malignant disease.

SECTION II.

EFFECTS AND TERMINATIONS.

Inflammation has only one genuine termination, namely: *resolution* or *recovery*—the inflammatory action subsiding and the part returning to its former state; but besides resolution, it may have either of the five following terminations—effects or consequences, as they ought rather to be called:

1. **Hemorrhage**, which may be occasioned by the destruction of the coats of the vessels. If it occur in the interior, it is termed *extravasation*. It is usually injurious, by producing pressure and exciting irritation; as, for instance, in the humors of the eye or membranes of the brain.

2. **Excessive Deposit**, either of serum or fibrin, which has exuded through the coats of the vessels. When serum is effused into cellular tissue, it constitutes *œdema*, which is characterized by *pitting* on pressure; when effused and collected in serous membranes, it constitutes *dropsy*. The effusion of fibrin requires a higher degree of inflammation, upon the subsidence of which new structures are formed by the organization of the fibrin, and parts are repaired; hence, the term plastic is applied to it. Thus, wounds unite, bones knit, and arteries consolidate.

3. **Suppuration** is the formation of a fluid called pus. It is called *laudable* when it is yellow, creamy, and opaque; insoluble in water, but readily mixing with it. It has no odor, but a slightly sweetish taste. It is not corrosive, but bland, and protective to tender granulations until covered by cuticle. When confined, it produces disintegration of the textures in contact with it by pressure. It is the result of a vital action, and it consists of a fluid and globules. The fluid is in the liquor sanguinis of blood effused; this separates into serum and fibrin; the fibrin becomes granular by the formation of exudation corpuscles, and these degenerate into pus globules. When pus is thin and acrid, it is termed *ichor*, consisting mostly of serum; in scrofulous persons, it is called *flaky*; when it contains blood it is called *sanies*; when it is of a leaden color, thick, coagulated, and very offensive, it is called *sordes*. Sometimes it is mixed with a subtle virus, as the venereal

or vaccine; it is then said to be *specific*. When mixed with mucous or serous discharges, it is termed *mucopurulent* or *sero-purulent*. When suppuration is profuse and long-continued in a debilitated frame, it produces a fever called *hectic*, which is a constitutional irritation different from the inflammatory type. It is remittent, and attended with paleness of surface, except upon the cheeks. The appetite is good, yet there is great emaciation. The tongue is clean; at first moist, but afterward dry and glazed, or aphthous. The bowels are constipated, or else attended with diarrhœa, termed *colliquative*. The palms of the hands and soles of the feet burn, and there is a great thirst. Respiration is rapid and short, pulse frequent and small; at noon there is increased fever, preceded by a chill; at night there is perspiration, most profuse toward morning. The eyes are bright, though sunk in hollow orbits; and though there may be sleeplessness, lassitude, and debility, yet the mind is clear and the spirits good.

4. **Ulceration.**—Hunter supposed that this process was entirely the result of absorption; but it is due to the gradual softening of a texture, changed by inflammation and suppuration, becoming disintegrated and fluid; it is partly absorbed, and passes away with the pus. The more violent the inflammation, the more rapid is the destruction. The term *phagedenic* is applied to those ulcerations in which the part is apparently eaten or consumed with unusual rapidity. Congestion is a predisposing cause of ulceration. The skin, mucous membranes, and cellular tissue yield more readily in ulceration than the vascular, nervous, and fibrous tissues. Persons of intemperate habits, and of scrofulous or syphilitic taint, are most liable to its ravages. The parts most liable to be affected are those in which circulation is weak and languid, such as the lower extremities, and parts newly formed: cicatrices, callosities, tumors, etc.

5. **Mortification.**—This term includes the dying and death of a part from injury or disease. *Gangrene* denotes the process of dying, and is recognized by the following signs: redness is changed into a livid hue; circulation is arrested—so is effusion; and there is less tension. Pain and heat abate, often suddenly. Putrescence commences, and there is an offensive smell. *Phlyctæna*, or vesicles filled with putrid serum, appear upon the skin. *Sphacelus* is the completion of the gangrene; the part is cold and insensible,

shrunk, soft, and flaccid, and crepitates distinctly, owing to its containing gas—the result of putrescence; the vital action has ceased, and the parts become black if exposed to the air. A *slough* is a small sphacelation. Nature makes an effort to throw off the injurious mass; the living part, in contact with the dead, inflames; and, in consequence, the abrupt livid line is bordered by a diffuse red and painful swelling—the *line of demarkation*. This vesicates; the vesicles burst, puriform matter is discharged, and an inflamed and ulcerated surface is disclosed—the *line of separation*. The furrow deepens; skin and cellular tissue first yield, the tendons and arteries resisting for some time. No hemorrhage occurs during gradual division of the parts; the arteries are sealed by the effusion of fibrin during the inflammation. But when the mortification is rapid, as in acute hospital gangrene, arteries are found playing in the dark and putrid mass, alive, while all is dead around them. At length *they* yield, and death is hurried on by-hemorrhage. The *constitutional symptoms* are of a typhoid character; the pulse is frequent and small, irregular or intermittent. The countenance is anxious, the face livid, the nose pinched, and the lips contracted. Anxiety is soon changed into stupidity of expression, as if the patient were under the influence of opium or alcohol. Sighing, hiccup, and involuntary movements of the hands and fingers are now observed, such as picking at imaginary specks in the air, fumbling with the bed-clothes, etc.; appetite fails; the tongue is coated with a brown fur, except at the tip and edges; the lips and mouth are dry and incrustated; swallowing is difficult; the mind is stupid, wavering, and subject to illusions; the articulation is thick and broken. Besides all these, we have, still more marked, a death-like coldness; clammy sweat; a small, indistinct, and fluttering pulse, and the cadaverous expression; the patient continuing in this state for hours, and finally dying without a struggle.

SECTION III.

FORMS OF INFLAMMATION.

Inflammation may be divided: 1. Into *healthy* and *unhealthy*, the former being that which naturally ensues in healthy constitutions when a part of the organism is impaired, being restorative in its tendencies, and only injurious if excessive or misplaced,

and usually concentrated toward one point; whereas, the *unhealthy* is essentially destructive, has little or no spontaneous tendency to recovery, and is liable to be widely diffused. 2. Into *common* and *specific*; the *common* arises from ordinary causes acting on healthy constitutions; the *specific* arises either because the system is unsound, as in scrofula, or because it is produced by a cause which is specific, as the poisons of small-pox or syphilis. 3. It may also be divided into *acute* and *chronic*; the *acute* is sudden in its seizure, violent in its action, and rapid in its progress—the *chronic* being less violent, and more tardy. Acute inflammation is sometimes called *active*; and *profuse* inflammation is often applied to chronic inflammation taking place in weak or debilitated constitutions. 4. Inflammation may be classified according to its tendency to produce particular local effects; thus, we frequently speak of *adhesive*, *suppurative*, *hemorrhagic*, *ulcerative*, and *gangrenous* inflammation. A thorough knowledge of inflammation, and its various forms, is indispensable to every practitioner of surgery. It should form the subject of study during his pupilage, and claim his especial attention and investigation during professional life. When it is recollected that there is scarcely any disease which comes within the province of this department of science that does not originate in inflammation, or that is not more or less affected by it during its progress, the force and extent of these remarks will be appreciated. The smallest pimple upon the body is as much an inflammation as an erysipelas that affects a large extent of surface. An ulcer of one of the mucous follicles of the mouth does not differ in principle from an ulcer of one of the glands of Peyer, which are the seat of so much disease and danger in typhoid fever. All accidents, whatever may be their nature or degree, are necessarily followed, if the patient survive their immediate effects, by inflammation. Without this process, there would be no reparation after injuries of any kind, however simple; and the art of surgery, especially operative interference, would lose its dignity and honor, and be estimated as little better than cold-blooded butchery. Thus, it is perceived that inflammation is capable of playing, as it were, a double game in the animal economy—being at one time a cause of death, and at another a source of life. It is for this reason that it is often designated by the terms healthy and unhealthy, according as the

one or the other of these states predominates. In studying, therefore, the history of inflammation, we should examine the appreciable phenomena that characterize it. These are known as its *causes*, *symptoms*, and *effects*. If we attempt to go farther, and philosophize upon the morbid influences that produce disease or inflammatory action, we become like the tempest-tossed mariner, without chart or compass, wrecked and stranded upon the rocks of hypothesis and conjecture. Let us be satisfied in investigating its appreciable phenomena as they become manifest to our external senses.

SECTION IV.

CAUSES OF INFLAMMATION.

The causes of inflammation are almost as numerous as the circumstances which surround us. Whatever has a tendency to injuriously affect our mental or material organization may induce disease. Pathologists have therefore divided the causes of morbid action into two classes: *predisposing* and *exciting*. By *predisposing* causes are understood those agents which produce in the system certain changes, states, or conditions, favorable to the development of inflammation without actually provoking it. The *exciting* causes, on the contrary, are those directly interested in awakening the disease, or fanning it into existence. Frequently these causes are so occult in their action as to escape the most critical acumen of the practitioner; in such cases human ingenuity fails of its purpose, and we are warned of our fallibility and the folly of further attempting to understand the hidden mysteries of God's providence.

1. **Predisposing Causes** are those agents that have particular reference to peculiarities of constitutions, and to a tainted state of the economy, in consequence of hereditary transmission. The predisposing constitutional causes are plethora, sanguine temperament, excesses in food and drink and bodily exercise, exposure to noxious miasmata, disorder of the liver, kidneys, skin, and other organs whose office it is to preserve the integrity of the human economy. Persons who have naturally an undue quantity of blood, as indicated by their ruddy complexion and the extraordinary functional activity of their organs, are peculiarly prone to inflammation.

Those, on the other hand, whose systems are naturally feeble, with delicate, sensitive organizations, are peculiarly liable to local congestions, which frequently prove intractable—more in consequence of heroic medication, developing “drug diseases,” I think, than the naturally feeble condition of the individual. In nervous persons, we find a predisposition to derangements of the nervous system—the brain, spinal cord, and sympathetic nerves—as exhibited in affections of the respiratory, digestive, and genito-urinary apparatus; maladies which are generally tardy in their progress, and which are often so obscurely marked as to be difficult of recognition. The fact that certain diseases are transmissible from parent to offspring, is a fact well known to all practitioners. Family diseases present themselves in this manner, just the same as likenesses, manners, and peculiarities; and an established fact in physiology proves that the mother, rather than the father, impresses her vices as well as her virtues upon her offspring. Sometimes these diseases may skip one generation to be ingrafted upon the succeeding one, as are frequently witnessed in the career of the physician. The affections most prone for transmission are gout, rheumatism, asthma, scrofula, carcinoma, carbuncle, pulmonary phthisis, constitutional syphilis, etc. It is in this manner that the sins of the parent are visited upon the children to the third and fourth generation. Among the acquired local predisposing causes of inflammation are the effects of previous disease, plethora, and debility, however induced. When an organ has once been attacked with inflammation, it is exceedingly liable to a recurrence of the disease from trifling causes. The part enfeebled by the attack does not recover entirely from its effects for a long time, if ever. Hence, influences which, in the natural state, would not disturb its physiological relations, are, under such circumstances, peculiarly prone to excite disease. An illustration of this fact is afforded in the tonsillitis of children, in whom a reproduction of the malady is almost sure to be awakened upon the slightest exposure to cold. Age, sex, temperament, occupation, food, dress, exercise, climate, and season, are all so many predisposing causes of inflammation. Infancy is peculiarly obnoxious to enteritis, croup, and arachnitis; childhood, to affections of the skin, struma, parotitis, and tonsillitis; manhood, to pneumonia, carditis, and diseases of the genito-urinary organs; and the decline of life, to

gout and rheumatism, asthma, arteritis, and the various forms of malignant diseases.

The function of parturition predisposes the female to peritonitis, phlebitis, arachnitis, and carcinoma; while the male, from his occupation and mode of life, is more prone to cystitis, gout, urethritis, pneumonia, arteritis, hepatitis, rheumatism, and pleuritis.

Temperament, as a predisposing cause of disease, is too little understood to speak with any degree of certainty. The sanguine temperament, being characterized by plethora, with inordinate capillary activity, disposes to inflammation of internal organs; the lymphatic, to affections of the skin, joints, stomach, bowels, serous membranes, and lymphatic ganglions.

Occupation is a powerful predisposing cause of inflammation. Persons who work much in the open air, and who are subjected to alternations of cold and heat, wet and dry, are extremely liable to attacks of inflammation of the mucous and serous tissues. A sedentary life leads to chronic disorder of the alimentary canal, and, if conjoined with constant mental exertion, is liable to be followed by affections of the brain and arachnoid membrane. Excessive exercise of an organ, as of the larynx in singing and speaking, is always a predisposing cause of inflammation of those structures.

Food has a peculiar influence in disposing to inflammation. The habitual use of stimulating drinks and articles of diet, especially when united with a want of due exercise, is among the most powerful of the causes noted. On the other hand, an impoverished diet, by inducing a defective blood, leads to scurvy, chlorosis, typhoid fever, scrofula, and inflammation of the serous structures, terminating in dropsical effusions. Certain articles, as ergot, if employed for any length of time, or in any considerable quantity, dispose to arteritis and gangrene of the extremities. The habitual indulgence in alcoholic drinks leads to gastro-enteritis, hepatitis, and attacks of epidemic diseases, whenever such diseases prevail.

Dress may be an indirect cause of inflammation, by being too thick or too light, and, therefore, not preserving the natural temperature of the body in variations of climate.

Change of climate, whether from hot to cold, or cold to hot, powerfully predisposes to inflammation. Hence, the period of acclimation is always peculiarly trying, and few persons escape

without suffering from this cause. Season, too, exerts a predisposing influence. Thus, in summer, inflammation is most apt to assail the stomach and bowels; and in winter, the lungs, pleura, joints, and throat.

Mental excitement is a prolific source of inflammation. Fear, grief, anxiety, hard study, loss of sleep, by deranging the secretions and interfering with the digestive process, all dispose to the production of this disease.

2. **Exciting Causes.**—The exciting or local causes of inflammation are those agencies which actually injure organized structure, as mechanical injuries and chemical agents, which tend to immediate destruction of tissue; also, heat, extreme cold, and friction. 2. Those which act through the sentient extremities of the nerves, as concussion, pressure, irritating applications—as mustard, cantharides, etc. 3. Anything which produces a peculiar impression and gives rise to a specific action of an inflammatory nature, such as decomposed animal matter, pus arising from specific diseases, dissecting wounds, etc. A fourth class of causes is made by Simon, in which are included the circumstances that produce a sudden change in the feeling of a part, as that experienced in the viscera of the abdomen after the removal of fluid in ascites. Under this class may be included any change in local nerves whereby deviations from normal nutrition may take place.

SECTION V.

THEORY OF INFLAMMATION.

I shall not enter largely into, or give a detailed account of, the various theories that have been originated respecting the *proximate cause* or *essential nature* of inflammation, but will briefly refer to a few of the many opinions that have been held touching this morbid process. Among the older writers, it was attributed to a *lensor* or *visciduity* of the blood; some ascribed its cause to an *error loci*—that is, an obstruction of the capillaries by the entrance of globules too large to pass through them. Cullen supposed that it consisted in *spasm* of the extreme vessels; Hunter ascribed it to an increased action; Wilson, Philip, and Hastings, to a debility; Henle, to a paralysis; and Earle, to an obstruction of the capillaries. Liebeg's

theory, which is of comparatively recent date, attributes inflammation to an unnatural oxydation of the inflamed tissues, and is probably nearer the truth than either; but it seems not to embrace the whole truth. According to the chemical theory, "there is a direct connection between the quantity of oxygen introduced through the lungs and the amount of fibrin in the blood; and any cause changing this relation favors the production of inflammation." The fact is, the process of inflammation is even yet imperfectly understood by medical men; hence, the various speculations and hypotheses in regard to this subject. The truth, probably, lies in a position intermediate between the chemists and vitalists—the process depending upon both, or part of both, of the theories assigned to this phenomenon.

Let me say a few words upon what the microscope has revealed concerning the actual facts of inflammation, after it has been excited in the frog's foot, or the mesentery of the rabbit: *First*—That in the capillaries of every *acutely-inflamed* part, and the larger vessels in its vicinity, the blood is circulated at first with preternatural rapidity and abundance, and serum is exuded into the interstices of the part. This may be called the first stage, or that of *increased vascularity* or exaltation of function; see Fig. 129, page 197. In the *second stage*, the blood stagnates in the focus of the inflammation; the red globules adhere to each other and to the sides of the capillaries; and *liquor sanguinis*, composed of serum and fibrin,* is exuded. This constitutes the process of *adhesion*. Or perhaps the blood-vessels are ruptured and a small quantity of blood becomes extravasated; this is hemorrhage. If the inflammation continues, the tissues become broken down and disorganized at the points where the inflammation is most intense, and *pus* is formed out of the exuded lymph; which is called the stage of *suppuration*. If the inflammation increases in severity, the blood ceases to circulate in the vessels, the tissue becomes soft and flaccid, and, in fact, mortifies.

* Virchow, in his Cellular Pathology, states his belief that there is at all times *two* kinds of fibrin in the system—one the *fibrin of the blood*, the other that of *lymph*; and that it is the latter which manifests this tardiness to coagulate.

SECTION VI.

TREATMENT OF INFLAMMATION.

In the treatment of inflammation, general principles only admit of being laid down, so extensive is the subject and so numerous are the various agents recommended for subduing this disease. The first and chief care of the practitioner is the removal of the cause, if possible, in the beginning of the attack. In neglecting such an important preliminary, whenever it can be effected, the most systematic treatment may be unceasingly employed with little or no avail. Suppose, for instance, a patient applies for relief from conjunctival inflammation caused by the lodgment of a particle of sand or dust in that membrane. The course to be pursued is, first remove the foreign matter—the cause of the local disturbance—and then apply medicated lotions of arnica, aconite or belladonna to the inflamed organ, and in a short time the inflammation will subside and the part regain its normal action. On the other hand, leave the foreign matter imbedded in the membrane, and the most assiduous and persistent course of treatment will avail little. The part will go on inflaming and extending to contiguous tissues until structural derangement takes place, with irreparable loss of vision. Such cases are recorded as the result of inattentive practitioners to a procedure so important to be understood in the treatment of inflammatory action. The first duty of the practitioner, then, is to ascertain the cause of the inflammation, and, if possible, remove it. This being done, the next thing to be accomplished is to obtain resolution, or, failing in this, to secure the most favorable termination, which, in cases of external inflammation, will generally be suppuration; in internal, disintegration and adhesion. To accomplish this purpose, the two prevailing systems of treatment are at variance. The *allopathic school* have adopted what is termed the *antiphlogistic regimen*, which consists in the employment of *blood-letting, purgation, emetics, diuretics, diaphoretics, counter irritation, diet, mercurials, and antimony*.

Bleeding.—This means of constitutional treatment, by some surgeons extolled as “standing at the very head of the list of constitutional remedies for inflammation as the most speedy and

efficient mode of relief," by others is as strenuously opposed as the most dangerous of devitalizing agents. The reasons assigned for this latter opinion are—*first*, that when an inflammation is established, it is not possible to cut it short by depletion; *second*, that general bleeding, unless carried to a very dangerous extent, will not sensibly diminish the amount of blood to an inflamed part; *third*, that bleeding will not render an impure blood pure; *fourth*, that depressing agents favor the extension of the morbid action and deprive the system of the power of rallying from the effects of the disease; that in many instances of inflammation there is depressed nervous power and impaired action of the heart; and that in all cases a depleting plan of treatment is found to be very badly borne in the present day.*

At Bethlehem hospital, the practice was *bleeding, purgation, and vomiting*. That is to say, the patients, on a certain appointed day, were bled; another, they were purged; and another, they were vomited. The custom generally prevailed to bleed in May and June, and purge in intermediate periods; *the precise time depending on the weather*. This practice existed for a number of years, no better system of treatment being then known.†

It is a favorite theory with some pathologists that inflammation, *now-a-days*, is different from the type of disease as it formerly existed—that inflammatory fever has changed from a sthenic to an asthenic character. This is the view taken by Dr. Alison‡ and others, who contend that, in consequence of this change, inflammatory diseases do not demand blood-letting and the active antiphlogistic remedies heretofore recommended by former writers. Upon the treatment of inflammation, says Tanner, "it may be remarked that those practitioners who have ventured to study the phenomena of acute inflammation for themselves, regardless of theories belonging to the past, and caring little whether or no disease has changed its type, are *now* mostly agreed that the treatment must be confined to simply attempting to guide the morbid process to a favorable termination by supporting the vital powers instead of lowering them." This cor-

* Tanner's Practice of Medicine—Inflammation.

† Report of Commissioners on Lunacy to the Lord Chancellor; London, 1847.

‡ Edinburgh Medical Journal, May, 1847.

responds with the homœopathic method of treating inflammatory diseases, and, from its well-known success, is worthy the consideration of all practitioners of the healing art.

Topical Blood-letting.—When venesection has been deemed inadmissible from various causes, under allopathic practice, recourse is had to blood-letting by means of cups or leeches. The same objections that apply to the abstraction of blood generally, may be urged with corresponding force to the use of this agent locally. As a means of overcoming inflammatory action, it is, however, manifestly preferable to general blood-letting, as its effects upon the system are less prostrating. There is little or no shock attending its employment, the blood being taken away gradually and in inconsiderable amount as compared to venesection. “Local bleeding,” says Lisfrane, “to be antiphlogistic, must be either small in amount and indirect in its extraction, or direct and copious. Let it be the *latter* when a constitutional as well as local effect is both expedient and permissible; the *former*, invariably, when we are anxious to husband the general vital powers and to attack only the local malady.”

Blood is abstracted locally in different ways—by *cupping*, *leeching*, *puncture*, *scarification*, and *incision*.

Cupping.—The quantity of blood to be taken by this process depends greatly on the part inflamed. The operation consists of two varieties—the *wet* and *dry* cupping. The *wet* is performed by the combined use of cups* and a scarificator, and has for its object the abstraction of blood from a part or organ.

Various contrivances have been employed from time to time for the local abstraction of blood; but, after repeated trials, all have given way to the ordinary process. *Dry* cupping consists in applying the glasses, having been exhausted of air, to external parts, just over, or contiguous to, internal organs in a state of inflammation. The determination to the surface by this means is said to relieve the congested parts within and facilitate their cure. It is recommended to be employed in violent inflammation of the lungs and other internal organs, and should be applied over a large surface to be productive of much benefit. In

* For a more thorough knowledge of this process, reference may be had to any of the standard works on Allopathic Surgery.

pneumonia, it is contended that excellent results follow this course of treatment, combined with the proper homœopathic remedies ; and in unyielding and severe cases, it may be employed as auxiliary treatment.

Leeches, another method of abstracting blood locally, are used when cupping-glasses and scarificators can not be employed, either from the position of the part or the nature of the tissue to be relieved from inflammatory action. They should be dried before used, and the part to which they are applied should be carefully bathed with warm water. When they are required to be placed upon any particular point, they should be put in a long, narrow vial, or inclosed in a stiff paper cone, of proper size to admit the head to project ; after they fall off, the bleeding is to be encouraged by fomenting the parts with cloths dipped in warm water and laid upon the surface. In children it sometimes happens that the bleeding is too copious, producing exhaustion of the vital powers. In such an event the flow of blood may be staunched by firm pressure on the leech-bite by means of a pledget of lint. If this fails, touch the wound with a finely-pointed stick of the nitrate of silver until an eschar is produced ; or the gaping surface may be transfixed by a small needle or pin, and secured with a figure-of-8 suture.

Scarification and Incision.—These methods are recommended when the inflamed parts are superficial, or when the skin and subjacent cellular texture are affected, as in inflammation of the mucous membrane of the eyelids, or phlegmonous erysipelas. They are esteemed of value in the treatment of superficial textures, not only by the abstraction of blood, but through the more important office of relieving the part by withdrawing the inflammatory exudation and giving an easy exit to the forming deposit.

Counter-Irritants.—Blisters are classed among the best forms of counter-irritants in recent inflammation ; it is advised, however, that care should be exercised that they be not applied too near the seat of an acute disease, and by no means employed until after the activity of the disease has been controlled by previous treatment. There is no doubt that these processes may have been of occasional value in the treatment of inflammatory affections of certain kinds ; but used indiscriminately and on all occasions, as advised by allopathic authority, it is equally certain that much

mischievous and evil results have followed their too common use. I agree generally in the remark made by Drs. Hill and Hunt, that "the amount of good done is never in direct proportion to the quantity of blood drawn,"* either constitutionally or locally, in inflammatory diseases.

Purgatives, Diaphoretics, etc.—It is unnecessary to pass in review the various remedies recommended under these two heads. As curative agents, they fall immeasurably beneath the remedies used by the homœopathists in the treatment of inflammatory diseases. On the other hand, I am inclined to the opinion that mild purgatives sometimes do good in evacuating the contents of the intestines, which, unmoved, produce more or less irritation of the system, with increase of inflammatory action. They act *mechanically*, by unloading and clearing away accumulated matter in the intestines, and in this manner favor the action of other medicines. It has been frequently remarked that after a free evacuation of the bowels, the same remedies, previously employed with little or no benefit, have been productive of most beneficial results. That these remedies are too frequently and improperly used by practitioners of the old school, even to the entailment of much suffering and distress upon the human family, is the daily observation of every candid and observing physician.

"The conclusion appears evident," says Tanner, "that in the treatment of acute inflammatory diseases, practitioners must be content to trust more to nature and less to heroic remedies than they have been in the habit of doing; for it is highly probable that, though we may be able to guide inflammations to a successful termination, yet we can not cut them short, and any attempts to do so will merely increase the patient's danger."

Having referred briefly—and I trust fairly—to the so-called antiphlogistic treatment of inflammation, I propose to consider the claims that Homœopathy justly makes in the method of curing these affections.

* Homœopathic Surgery, by Drs. Hill and Hunt—Treatment of Inflammation, p. 37.

HOMŒOPATHIC CONSTITUTIONAL TREATMENT.

The superior efficacy that Homœopathy possesses in the treatment of all inflammatory diseases, whether local or general, of a sthenic or asthenic type, has stamped it as the most successful and rational mode of curing these diseases. A treatment so simple and so perfectly in accordance with nature's laws in preserving and maintaining the harmony and integrity of her vital economy, in subduing disease and restoring impaired function, is essentially opposed to the perturbing and life-destroying influences that mark the treatment of the allopathic school of practice. It is on this account brought in strong contrast with other modes of treatment, and only demands of the candid and honest practitioner a clear and comprehensive investigation of its curative power to establish it as the most rational, and at the same time most successful, method of curing inflammatory diseases.

There are two things which should never be lost sight of by the surgeon in the treatment of inflammation—first, that in the inflammatory process, and at each subsequent step thereof, nature seems to be making efforts to cure, and that many of the phenomena of the disease are results of those efforts; secondly, and of almost equal importance with the other, is to correctly understand the stage of the inflammatory process when called upon to treat the case. This is especially important in all those inflammations where both general and local applications are called into requisition during the treatment. In a patient suffering from the *primary* effects of the inflammatory process, before dilatation of the vessels has proceeded to any great extent, those remedies will be most speedily curative which are homœopathic to the beginning of the process. When the *second* stage of inflammation begins, and the blood is rushing with increased force, producing engorgement and over-distention, followed by a contraction more or less spasmodic, with relaxation and contraction succeeding each other until the power of contraction is lost through want of capillary nerve-vigor, with stagnation ensuing—then inflammation is fairly established, and other remedies are called into requisition.

Unless the student start out with the intention of closely studying nature—taking counsel with her and following her superior guidance—I have no hesitation in saying that he will be unfit to

render that wise and judicious assistance that an enlightened surgical science justly expects at his hands.

The remedy which I shall first notice as standing at the head of its class as one of the most important in the treatment of inflammations, and those toxicæmic agencies that produce in the human organism the phenomena known as the inflammatory process, is

Aconite.—In all cases of pure synochal inflammations, this agent proves both useful and in most cases a specific remedy; and is immensely superior to the antiphlogistic blood-letting of the old school, in this — that we cure the inflammation without, as Tanner says, “going out of our way to produce debility, and thus favor the occurrence of toxicæmia.” It is generally the first remedy indicated in true inflammatory excitement. It is of little importance in what part the inflammation is located — whether in the coverings of the brain, the mucous or serous tissues, the muscular or glandular system, or the nobler organs within the three great cavities of the body. Whenever, says Hemple, the local disturbance is accompanied by a full, hard, and bounding pulse, dry and hot skin, coated and dry tongue, restlessness and thirst, aconite is invariably in its place. Its use is to restore the capillary equilibrium and calm the nervous excitability, thereby producing a resolution of the inflammatory process. Its action, says Hemple, “is primarily upon the cerebellum and upon the terminal ramifications of the cranial, spinal, and sympathetic nerves, interwoven in the capillary tissue.” It unloads the contracted, torpid, or semi-paralyzed capillaries, which give rise to acute congestion or inflammation, and directs the blood onward in its course, relieving the effects of such capillary stagnations upon the general circulation. I have repeatedly felt justified, on the strength of numerous observations, says Diez, in declaring that aconite is regarded as a universal antiphlogistic, and corresponds to the first stage of inflammation. As a remedy for such, it occupies the foremost rank among all medical plants which have been proved up to the present time. It is especially adapted, according to Noack and Trenks, to all acute local congestions, with erythysm of the nerves; occurring in persons of a plethoric habit, in a bilious, nervous, or sanguine temperament. This remedy has been highly extolled in inflammatory affections by some practitioners of the allopathic school. Fleming remarks, “with regard to its physiological effects, it is a mighty antiphlo-

gistic, indicated in great excitement of the circulation.”* Miller proclaims it, also, as “a powerful antiphlogistic. It tends to relieve, by cutaneous and other secretions, but its most important effect is to lower the heart’s action and general circulation. In this respect, indeed, it is perhaps the most simple, and yet the most powerful, of sedatives. Small doses, such as half a drop or a quarter of a drop, of the strong tincture, in aqueous solution—repeated every hour, every half hour, or every two hours—are quite safe, and are truly antiphlogistic. Often, after their use, the pulse will be found to come down even rapidly, the other febrile symptoms at the same time giving way.”†

Lombard‡ regards its action as affecting particularly the heart and circulatory system. Its general indications point to inflammatory diseases and organic degenerations of the heart and great vessels. Mr. Liston, the late eminent surgeon, “used aconite in subduing inflammation and reducing vascular excitement, and regretted that the power of aconite to abate vascular over-action, and supersede the necessity for abstraction of blood in many diseases, was not known to him earlier. He was convinced that it would have prolonged the life of his father, whose death had been hastened, in his opinion, by ill-judged copious venesection.”§

As the greater part of acute diseases are inflammatory in their character, it is natural that homœopathists, from the indications of the remedy, should employ it in inflammatory affections of whatever type and severity. It has proven itself, by repeated observation, to be an indispensable remedy in all those cases in which, through violent reaction of the organism, there is produced general febrile disturbance, followed by hot, dry skin; thirst; quick, full pulse; local or general long-continued heat; loss of appetite; restlessness; exhaustion; more or less violent delirium, etc. It not only supplies the place of all the antiphlogistic remedies of the allopathic school, but is far superior to them all, as well in certainty of result as (what is of great importance) in harmlessness of action.

Dose.—In treating inflammatory diseases, the quantity of the remedy indicated must be determined by the surrounding circum-

* Fleming on the Properties of Aconite, p. 50.

† Principles of Surgery, p. 153.

‡ Gaz. M. de Paris, October 10, 1835.

§ Medical News, December, 1861, p. 15.

stances, such as age, sex, temperament, susceptibility, intensity of the affection, etc., as carefully weighed by the practitioner; and the utmost liberality should be entertained toward all who subscribe to the law of "similia," whether they employ the *low* or the *highest* potencies. No one knows better than the surgeon, who watches at the bed-side of his patient and carefully makes his observations and deductions, as to the quantity of medicine required to effect the desired purpose, viz: restoration to health. Some diseases succumb quickly and permanently to the higher potencies, while others as inexorably demand the lower. In works on practice, therefore, I believe it to be impossible, and even impracticable, to lay down any fixed rules or formulæ by which to regulate the dose of a remedy. This must forever remain a "questio yexata" theoretically, and can only be determined practically by the judgment of the practitioner, by a careful and judicious investigation of *all* the circumstances in each and every disease he may be called upon to exercise the function of his art. If diseases are cured at all by medicines, undoubted and multiplied evidences exist that they are thus cured by low potencies, and *vice versa*. In recommending, therefore, the preceding remedy as one of the most valuable in subduing inflammatory action, I shall leave the question of dose to be decided upon by the practitioner, leaving him to determine whether to employ the *tincture*, or the *highest known potency*.

Gelsemium.—This is a remedy of decided curative powers in inflammatory affections of a sthenic type; but many are of the opinion that it is inferior to the first-named remedy in pure synochal fevers. It was first prominently brought into notice by the physicians of the eclectic school, who indulged in the most extravagant praises of its virtues. As a febrifuge, it is a remedy of unquestionable value, as it possesses anti-periodic properties in a marked degree. "In simple fever, without functional disturbance, Dr. Douglass declares it to be specific; given at the onset of any fever of simple, uncomplicated character, it will undoubtedly arrest it very promptly."* In simple "irritative fever," so called, it is more competent to relieve the accompanying phenomena than aconite; and in such cases demands the attention of the surgeon.

* New Homœopathic Provings, by Dr. Hale—article, Gelsemium.

It corresponds with the excessive nervous irritation, the tendency to irregular convulsive action, the periods of wakeful debility, and the accessions of feverish stupor. Thus, in inflammatory fever following wounds of considerable severity, or the result of extensive suppuration from whatever cause, gelsemium may be used with considerable advantage in restoring the natural secretions and calming the irritation of the nervous system. It has been quite thoroughly tested by physicians in different parts of the United States in the treatment of fevers, acute and chronic rheumatism, pleurisy, pneumonia, etc.; and is acknowledged to be a remedy that possesses great merit. In the endemic fevers of this country, that sometimes follow wounds and injuries of various kinds, it acts promptly in quieting nervous irritation and excitement, equalizing the circulation, promoting perspiration, and rectifying the various secretions, without causing nausea, vomiting, or purging. It is a remedy that requires caution in its administration, as serious results have followed its excessive use. In large doses it produces narcotism and partial paralysis, with great loss and prostration of the muscular system; headache, impairment of vision, and inability to open the lids. When such effects are observed, the remedy should immediately be withdrawn, and the symptoms will soon subside—the patient being more strengthened than debilitated by its use. Dr. Hall says that he was induced to try it in inflammatory affections as an analogous remedy to veratrum viride. He found no *marked* prostration was caused by the remedy, and that the pulse was less quickly reduced than by the veratrum. In few cases was the heart's action fully lowered in less than twelve hours; but it was well controlled throughout the rest of the disease in a majority of cases. The gelsemium appeared to produce a general calming influence, even during the early part of its administration—affecting the *volume* of the pulse before any marked impression was observed on its frequency. It seemed also, says the same writer, to promote the secretion of the kidneys and to *produce an erythema of the skin*. Dr. Douglass, of Chester, S. C., treated a neglected case of *gonorrhœa*, of several months' standing, with a tincture of the root. The dose given was a tablespoonful of a mixture made from a handful of the root, in a common junk-bottle of whisky, night and morning. After a few doses, the effects upon

the patient's eyes were alarming, and apprehensions were entertained of a complete loss of vision. The remedy was discontinued, and every symptom of gonorrhœa disappeared—the cure was complete. Since then he has treated a number of cases with it, and in each instance with the most gratifying success.

Dose.—From the tincture to the highest potency. The best effects in surgical diseases are produced, as far as my observation goes, by the lower dilutions. The manner of administering the remedy the most successfully, in my hands, has been in aqueous solution, viz: from 5 to 10 drops in ten tablespoons of water, and given as often as the circumstances of the case demand. When administered to children, a corresponding diminution in the dose should be given.

Veratrum Viride.—This remedy has attained, within the past few years, an enviable reputation in controlling the action of the heart and the arterial circulation. It exerts a powerful impression upon the nervous centers, and, through them, upon the great center of circulation, and resembles in its action the impression made by aconite. It mitigates pain, especially that of a spasmodic character—relieves hypercatharsis, but does not produce anæsthesia. Besides its sedative action on the arterial circulation, it unquestionably promotes and sustains diaphoresis and expectoration. In fact, it exercises an alterative action upon the glandular system, re-establishes the locked-up secretions, and relieves the system of the effete matters that clog and embarrass its harmonious action. It is probably from this two-fold agency that the remedy has acquired such a prominent reputation in some inflammatory affections to which it seems so closely allied. Dr. Hale remarks, “it is peculiarly adapted to all cases where there is much febrile or inflammatory action.”* Dr. Norwood says “he has reduced the pulse, by use of the tincture, to thirty-five beats per minute, without exciting the least nausea or vomiting.”† Prof. Wood classes it among the “nervous sedatives,” along with digitatis, aconite, and its nearest analogue, veratrum album. Dr. Cauniff‡ says that, as a medicine, it is a powerful antiphlogistic—that it acts upon the heart promptly and powerfully, producing a coolness and moisture

* Hale's new Homœopathic Provings—Verat. Viride.

† Ibid.

‡ Principles of Surgery, p. 87.

of the skin in a very short time. He employed it in two cases of wound of the lung by a musket-ball, when the symptoms were most urgent, and with the most satisfactory results. Dr. Burt is confident that its impression on the heart and great vessels is so powerful that, had he not assumed the horizontal posture during the action of the remedy which he was proving, "the syncope would have proved fatal"—probably by producing paralysis of the heart.

"The reduction of the pulse under the use of this remedy," say Drs. White and Ford, "is accompanied by a notable cooling of the body; by a well-marked diminution of headache, pain in the back and limbs; of restlessness and anxiety; of the frequency of the respiration; of the congestion of the skin, flushing of the face, tumefaction of the tongue, and injection of the conjunctiva." In opposition to Dr. Norwood, they assert that "the first doses were frequently thrown off from the stomach, in severe cases, but the succeeding ones were commonly retained. This vomiting was rarely severe, ceasing of itself upon a temporary discontinuance of the remedy, or yielding readily to common restoratives." This corresponds with my own observations, as I have frequently remarked in children and in elderly persons. When such a complication follows its use, it should be immediately discontinued, or given in the higher potencies. "In diseases of the brain, assuming a congestive character," says Hale, "arising from plethora, vascular irritation, coup de soleil, dentition, or suppressed discharges, I know of no drug—not even belladonna—so useful." In pneumonia and pleurisy, following wounds or injuries, I have found it a valuable remedy. Dr. Davidson says: "In pneumonia and pleurisy I have followed no other particular treatment for the last two years than this medicine, and, I am happy to say, I have never seen a case terminate unfavorably under the treatment. I look upon the veratrum as being worth all the other treatments combined for pleurisy, pneumonia, and all other diseases of an inflammatory character."* In pneumonia, the sooner the pulse is reduced, the better. "The inflammation being in a degree arrested, the lung," says Patton, "is saved from the more severe consequences of the second stage, or that of *red hepatization*; the exudation is in a great degree arrested, and the patient, in a majority of cases, enters into a favorable convalescence."† I know of no positive, well-marked

* Nashville Jour. of Medicine. † Tilden's Jour. of Mat. Med., vol. i.

results that have followed the use of this drug in the higher potencies in subduing inflammatory action, and think, from the *characteristics* of the remedy, that it is more especially indicated in the lower dilutions, from the first to the sixth. In children, whenever employed, the dose should be correspondingly modified.

Dose.—In regard to the potency of the dose, there has been much discussion. I have always, in urgent cases, given it in the lower potencies until its effects on the circulation were well marked and decided; then, discontinuing it altogether or alternating with other remedies, as occasion demanded, have succeeded in quieting the most violent and tumultuous inflammatory action. In regard to the quantity to be administered, I feel it presumptuous to give any fixed formulæ, and entertain the utmost liberality toward my professional brethren who may differ with me in its use. I would caution practitioners, however, from its *too liberal use*, as extreme prostration, almost amounting to paralysis of both the nerves of motion and sensation, has occurred from its excessive employment.

Arsenicum.—This remedy is indicated in inflammatory conditions, and appears to exert a specific influence on several portions of the body, particularly the alimentary canal, the heart, and nervous system, and is specially curative in threatening gangrene or paralysis of the motor-nerves. It is suited to melancholy, and to persons of impoverished, exhausted, and nervous constitutions, and to both acute and chronic inflammations. "The physiological-therapeutical range of arsenic," says Hemple, "is only rivaled by the wonderful health-disturbing, and therefore health-restoring, properties of aconite. To the careful observer, the symptomatic resemblances of aconite and arsenic must seem striking. The part which aconite seems to play on the surface of the organic functions is enacted by arsenic in the utmost recesses of vitality. The aconite fever is evanescent—a chill or some chilly creepings or shiverings along the back, followed by a moderate degree of heat and moisture, corresponding in quantity with the intensity of the previous rise of temperature. The *arsenic chill*, on the contrary, seems to freeze the vital blood in the very laboratory of the heart; the subsequent heat is like a consuming fire, burning up the vital moisture of the pores until a soaking, debilitating perspiration is supplied by the reactive forces of the organism, as a restorer of their disturbed

harmony.”* In typhoid fever, therefore, following surgical operations, or as complications of pre-existing disease or accident, arsenicum will be found a valuable remedy. It corresponds more closely to those adynamic characteristics of the system in which the vital fluids are more deeply affected by the morbid process, the urine assuming a dark-colored and foul appearance, with scanty secretion; and where there exists a manifest tendency to the formation of sores and ptechiæ, the bowels being either torpid or tympanitic, or else disposed to diarrhœa both offensive and prostrating, with evident signs of decomposition. In inflammations of a malignant type, tending to disorganization, with prostration of the vital forces, which have a tendency to terminate in *erysipelatous*, *gangrenous*, or *cancerous* affections, arsenic is a potent and reliable remedy. In ophthalmia, scrofulosis, leucoma, granular blepharophthalmitis, arcus senilis, deafness of scrofulous persons, and chronic coryza, great benefit has been derived from the use of this remedy.

Dose.—Arsenic may be employed from the first to the highest potency. In chronic cases, or where the system has been much prostrated by pre-existing disease, I have seen most marked results follow the use of the higher triturations. In the more active and recent forms of inflammation, to which this drug may be *en rapport*, the lower potencies, from the first to the sixth, have been equally productive of good results.

Arnica.—The effects of this drug are marked with peculiar energy upon the brain and nervous system, as is manifested by headache, spasmodic contractions of the limbs, and difficulty of respiration, resulting from its use. It is specifically indicated in those stages of inflammation where there is a tendency to extinction of the vital powers, and is contra-indicated in the more active forms of inflammatory excitement so characteristic of aconite. Experiments have been made, remarks Hemple, “both with the flowers and the root, justifying the conclusion that arnica acts powerfully upon the vegetative sphere, and that it stimulates the absorbent powers of the capillaries, particularly in cases where they have been weakened, or suspended even, by external injuries. Hence, we see that the *primary* action of arnica upon the absorbents must be to depress their activity,

* Hemple's *Materia Medica*—subject, Arsenic.

and to induce precisely such derangements as will naturally flow from the functional torpor of the vegetative or reproductive sphere." By virtue of its action upon the capillary and dermoid tissues, it is especially useful in those inflammations that are the result of blows, bruises, contusions, wounds, sanguineous extravasations, and injuries of all kinds. It relaxes the contractility of the capillary vessels, and favors effusion into the parenchymatous structure; at the same time it checks the action of the absorbents; the effusion thrown out forms a more or less permanent extravasation; and hence, says Hemple, "the homœopathicity of arnica to consequences of external injuries." Contusions and lacerations of the muscular fiber seem to constitute the chief sphere for the therapeutic action of this drug in traumatic diseases. In *traumatic fever*, consequent upon injuries of a violent nature, and following surgical operations, arnica should not be relied upon; aconite is the great remedy in such cases.

Dose.—From the first to the thirtieth potency.

Belladonna is especially called for in persons of a plethoric nature, with tendency to congestions of blood to the head. It seems to act *primarily* upon the cerebro-spinal system of nerves, and *secondarily* upon the vascular apparatus. Its power to cure *tetanic spasms* is evident from its action on the motor nerves implicated in this disease. The great influence which it exercises over the functions of the cerebro-spinal axis points to it as a reliable remedy in the most formidable cerebral inflammations. In *typhoid fevers* following surgical operations, or injuries of whatever kind, where cerebral symptoms predominate, it is strictly homœopathic. In *erysipelatous inflammation* following wounds, especially when it is disposed to invade an inner tissue, or when it attacks the face and spreads to the head, inducing inflammation of the cerebrum and its envelopes, this is a prominent remedy. "Belladonna," remarks Miller, "is anodyne and antiphlogistic; as an opponent of erysipelas, it enjoys a considerable reputation." Liston says, in speaking of a case of erysipelas: "We subdued the fever with aconite, and then administered the extract of belladonna, and in twenty-four hours the disease had quite disappeared. How this effect is produced, we can not say, but it seems to act like magic; and so long as we benefit our patients, we have no right to condemn the principles upon which this treatment is recommended and pursued." In ophthalmia and diseases peculiar to that organ, such as

sclerotitis, conjunctivitis, corneitis, iritis, and retinitis, it is in specific therapeutic rapport, and may be used both externally and internally with confidence in its curative power. In inflammation generally, it possesses a marked affinity, and is distinguished from the inflammation to which aconite is specific, as beautifully and systematically portrayed by Prof. Hemple: "*Aconite* produces inflammation by depressing the functional power of the capillary ramifications of the ganglionic nerves, leaving the brain undisturbed, except in so far as it suffers from the effects of the functional derangement of any portion of the nervous system. *Belladonna* causes inflammation by first depressing the brain, after which the functional power of the ganglionic system becomes similarly but secondarily affected. It affects the brain primarily and the ganglionic system *incidentally*; whereas, aconite affects *primarily* the ganglionic system, and *incidentally* the brain. The first effect of belladonna upon the brain is to depress or unhinge its functional power, and, incidentally, the functional power of the ganglionic system; the stage of organic reaction is characterized, as in the case of aconite, by capillary engorgements; a full, rapid, and bounding pulse; glowing redness of the face; protrusion and suffusion of the eyes; heat of the skin, etc. But in the case of belladonna, the antagonism seems to be between the capillaries and the central point of the nervous system—the brain; whereas, in the case of aconite, the antagonism is between the capillaries and the terminal ramifications of the ganglionic system. Hence, in the case of belladonna, the antagonism is marked by more obstinate, more deep-seated, and more dangerous symptoms than in the case of aconite. If, in a case of inflammation, the capillaries, under the stimulating effects of aconite, persist in remaining engorged; if the redness, swelling, and heat continue; if the cutaneous exhalations show no signs of return; if the brain continues to feel dull, weary, torpid—we may rest assured that the primary seat of the inflammation is not in the ganglionic system, but in the brain itself. We do not know of a single affection that, under ordinary circumstances, requires aconite, for which belladonna might not likewise be indicated, if the origin of the disorder is traceable to an invasion of the functional powers of the brain itself, instead of depending upon a simple depression, or (to use Birchat's language) *irritation* of

the ganglionic system. All the congestions, inflammations, nervous and cutaneous disorders, to which aconite is specifically adapted, may require belladonna whenever the starting-point of the affection, or the primary perception thereof by the sentient organism, has to be sought in the immediate province of the brain itself."* It is indicated, therefore, in sub-acute inflammations of the brain itself and its membranes, either alone or in alternation with aconite—especially when characterized by burning fever, sopor, dizziness, heat, dry and brown tongue, with great thirst, sensitiveness to light, retention of urine, etc.

Dose.—From the tincture to the thirtieth potency. I have used with much benefit the *second* to the *sixth* potency in *acute* cases, and from the *sixth* to the *thirtieth* in *chronic* affections. In a few cases I have given one drop of the tincture, or its equivalent in the first potency, with the most brilliant effects. In children of an exceedingly sensitive organization, it has been employed in the highest potencies, and it is said with most excellent results. Like all our therapeutic agents, it depends as a curative power upon the surrounding circumstances of each individual case and the judgment of the practitioner in discriminating the potency required.

Baptisia Tinctoria.—This remedy is indicated in inflammations of an adynamic type, and in those fevers assuming a typhoid character. It is said to possess remarkable *antiseptic* powers. "Applied in the form of a wash," says Hale, "to ulcers, mucous surfaces, etc., where there is a tendency to putrescency of the fluids and solids, gangrenes, fetid discharges, it is said to correct the conditions alluded to in a very prompt manner."† It is therefore recommended in malignant sore mouth and throat, mercurial ulcers, scrofulous and syphilitic degenerations, and erysipelatous ulcerations. "It acts powerfully," says King, "upon the glandular systems, increasing all their secretions." The leaves, applied as a fomentation to a part, are claimed to have discussed tumors and swellings of the female breast resembling scirrhus. The *general* action of baptisia upon the nervous system is as a *sedative*, causing a degree of paralysis both of sensation and motion. It is inferior to gelsemium and aconite, which remedies it resembles, in this: that

* Hemple's *Materia Medica*—Belladonna, p. 344.

† Hale's *New Homœopathic Provings*—article, Baptisia, p. 40.

the erethism of the nervous system in baptisia is due to *debility*, while in the two latter it is referred to its *excitant* properties.

Dose.—From the first to the thirtieth potency.

Bryonia Alba.—This is a medicine, says Helmuth,* of great value in inflammations of many organs and tissues of the body, when there are flying, darting pains, with chilliness, or when the inflammatory swellings are tense, hot, and rather pale, with stinging during motion. Noack and Trenks define its action as exciting both the peripheral nerves and capillary vessels, thus giving rise to symptoms intermediate between inflammation and nervous irritation. It is especially curative in hyperæmia of the serous membranes, and in affections where resorption is required, such as typhoid infiltrations, serous effusions, and sanguineous exudations. It is particularly adapted to rheumatic and arthritic inflammation,† and especially so when it attacks the serous, mucous, and cellular tissues. In the purely synochal form of inflammation, it will be found of doubtful efficacy; but in inflammations of a torpid character, developed from a rheumatic or arthritic base, or in acute inflammations threatening to lapse into the stage of exudation or paralysis, with a small, soft, or even compressible pulse, it becomes a remedy of great value. It is particularly indicated in tearing and lacerating pains *increased by motion* and aggravated at night. The temperament indicating bryonia is the choleric or bilious — persons with brown or black hair, light complexion, and with irritable dispositions.

Dose.—From the first to the thirtieth potency, according to individual peculiarities.

Chininum Sulphuricum.—This agent, in large doses, depresses the pulse, rendering the heart's action not only slower, but feebler. In cases of violent cerebral irritation, remarks Hemple, “where quinine may have to be employed, disturbances of the special senses and the depression of the vascular system constitute important indications for its use.”‡ It may be useful in periodic diseases following surgical operations, or when paroxysmal affections occur during the treatment of surgical diseases, as frequently happen in mias-

* Helmuth's Practice of Surgery—Treatment of Inflammation.

† Hemple's Materia Medica, p. 384—article, Bryonia.

‡ Hemple's Materia Medica, p. 421—article, Chin. Sulph.

matic regions. Cerebral congestions, where they assume a paroxysmal tendency, and exacerbations that take place every other day, will often yield to this remedy. Aconite or gelseminum may be given during the paroxysm, and quinine in the interval or stage of apyrexia.

Dose.—The remedy may be used either in trituration or by dissolving the alkaloid in diluted sulphuric acid, in the proportion of ten grains to thirty drops of the acid; then mix with water in the required quantity, and give according to circumstances.

Hepar Sulph. is more especially indicated in the secondary stage of inflammation, or during the process of suppuration. It acts upon definite systems,* enveloping membranes; upon the fibrous, mucous, serous, osseous, cutaneous, and abdominal nervous systems; it is adapted to abnormal conditions of reproduction—hence it is useful in scrofulosis and rachitis; it is suitable for lymphatic constitutions, venous-hemorrhoidal, plethoric individuals, and to such as are subject to blennorrhœa, glandular swellings, and enlargement of the abdomen. It is more adapted to children and females than to males.

The **Calcaria Phosph.** is more particularly adapted to scrofulous affections of bones, *ramollissement*, *curvatures* of the vertebral column, *spina bifida*. Lehmann says of this salt that “it is the most important of all the mineral substances which, by their physical properties, are of service in the animal body. The use of its presence in the bones, where it gives solidity and strength to the osseous skeleton, is at once apparent. Bones deficient in this salt are also deficient in firmness.” Thus we observe that softening of the bones occurs in those conditions where the animal organism does not receive a sufficient supply of phosphate of lime, or where certain physiological processes require an increased consumption of this salt, as in pregnancy and during the dentition of children. Rachitis frequently if not always occurs during the period of dentition; and the consumption of the phosphate of lime during pregnancy is often so great that scarcely any traces of it can be found in the urine. During this period of woman’s life, fractures unite with extreme difficulty, and sometimes do not unite at all. It is useful in scrofulous ulcers, psoas abscess, scrofulous ulceration of

* Hemple’s *Materia Medica*.

joints, and in the reunion of bones in fractures where there is a tardy deposition of callus. In lupus of the face, herpes, tinea capitis, it has proved of great service.

Dose.—From the third to the thirtieth potency.

Mercurius, however, is the notable remedy for ulcerations of the glandular system, and in chronic abscesses which are slow in culminating. In ulcerations of the throat and buccal cavity, it produces the most beneficial results. It is homœopathic to all ulcerated surfaces, such as the phagedenic, spongy-indolent, scrofulous, varicose, and fungous ulcers.

Dose.—From the first to the thirtieth trituration.

Rhus Tox.—In wounds of *tendons, ligaments, fibrous and serous* tissues, this remedy will be found productive of much better results than arnica. It may be associated with aconite, which keeps down the inflammation and prevents the exudation of coagulable lymph.

Dose.—Same as before stated.

Regimen is not an unimportant part of the treatment of inflammation. It comprehends: 1. *Diet.*—This is to be given but sparingly, and invariably of a non-nutritious character so long as the action continues unbroken; and even then, return to the accustomed diet should be cautious and gradual. In general, loss of appetite and loathing of food are quite prominent during the progress of inflammation; it is during the period of decline that precaution is necessary in denying the returning appetite or deceiving it by unproductive materials. A hearty meal, fearlessly indulged in, has often reinduced the pre-existing malady. Drink should be bland, simple, and cooling, and taken in small quantities. Thirst, being a prominent symptom in inflammatory fever, should be assuaged with due precaution. Jelly waters, tamarind water, orangeade, and lemonade, when not contra-indicated by the remedies used, are exceedingly palatable, and grateful to the parched mouth and locked-up secretions. 2. *Rest* of the body, with mental quietude, is important to be considered in the treatment. Restlessness and jactitation denote constitutional disorder, and should be counteracted by appropriate medication. 3. *Air.*—The importance of having a free supply of pure air in the sick-chamber is one of the most effectual means of restoring a healthy condition of the blood. Imperfect aeration leads to obstruction of the capillaries, systemic as well as pulmonary, and is productive of much

mischief to the already depressed economy. This important aid in overcoming inflammatory action should not be overlooked in the treatment of all surgical diseases.

HOMŒOPATHIC LOCAL TREATMENT.

The local remedies in the treatment of inflammation consist of *rest* and *position* of the affected part, the abstraction of blood, cold and warm applications (either medicated or simple), pressure, and counter-irritation.

Rest.—It is the duty of the surgeon to procure as steady and persistent rest of the affected part as circumstances will permit, which should be maintained throughout the whole period of treatment. The surgeon who neglects this important precautionary means performs only a part of his duty. It is in this that he possesses an advantage which the physician can not hope to enjoy. In inflammations of external organs, the most complete rest may be enjoined; while in affections of internal structures, such a condition can only be partially exacted. For the want of this precaution, an inflamed joint may be rendered stiff and useless; or a conjunctivitis that might be cured in a few hours, for the want of a little rest of the eye may run into a severe and persistent ophthalmia. Rest is, therefore, considered an essential requisite in the treatment of inflammation. Whenever it can not be procured by the efforts of the patient unaided, appropriate splints and other mechanical contrivances should be employed to effect this purpose. It is most beneficial in the early stages of inflammation, and until the morbid process has reached its culminating point. After this it should not be too rigidly enforced, for fear of permanent injury to the limb. I have seen the most disastrous results follow inattention to the proper manipulation of a fractured joint after inflammatory action has subsided. This manipulation should be begun when all traces of morbid action have passed away, and then it should be conducted with gentleness and caution, for fear of re-exciting inflammation in the part. This movement should be continued from day to day until perfect motion is procured.

Position.—The part should not only be kept at rest, but maintained in such a position as to favor the circulation of blood through it. In inflammation of the knee-joint, for instance, it

should be not only bent, but placed in an elevated position, in order to favor the return of venous blood and retard the arterial flow to the part diseased. In *orchitis*, who has not witnessed the beneficial results of position and rest when conjoined with appropriate remedial treatment? In *whitlow*, how great is the relief afforded by simply elevating the hand; and in *odontalgia*, how striking is the difference in the amount of pain when lying down or standing in an erect posture. The inflamed part should not only be elevated and maintained at rest, but placed in the most easy and comfortable position. All restraint should be taken off, and muscular contraction entirely counteracted. Thus, in inflammation of the knee-joint, the limb should recline upon its outer surface, a pillow being placed in the ham, this being the best position for preventing tension. In synovitis of the elbow-joint, the forearm is bent at a right angle with the arm; and in hip-joint disease, the thigh is slightly flexed upon the pelvis, and turned toward the sound one.

Punctures are of use frequently in superficial inflammations of the skin—*incisions*, when inflamed parts are covered with a dense, unyielding fascia, as in whitlow; or where there is great tension, as in phlegmonous erysipelas; or when the inflamed part is infiltrated with an irritating fluid, as in extravasation of urine; or with unhealthy matter, as in tubercle.

Cold Applications.—Cold has been employed in the treatment of inflammation from the earliest history of the art of healing. It had partially fallen into disuse in this country until its beneficial effects were fully demonstrated during the existence of the late civil war. Thousands of cases of fractures and gunshot wounds have been treated by simple topical applications of cold water alone, with the most satisfactory results. In fact, in inflammations of the external parts of the body, this agent was relied upon locally, almost entirely to the exclusion of all other remedial measures; and the satisfactory results obtained fully justify its use as one of the most important auxiliaries in subduing inflammatory action. It is generally applied to the part in the form of cold water, its chief effect being ascribed to its sedative [?] properties, especially when applied with diligence. If applied to a part in health, and continued, it will interfere with nutrition; and when applied to an inflamed part, acting homœopathically, it lessens the morbid action going on therein. It is more especially indicated in the early stages

of inflammation, before congestion sets in. Thus, in applying it to *incised, lacerated*, or other wounds, our great object is to prevent threatened inflammation, or at least so to retard and limit the morbid process as to preclude serious structural lesion. As we succeed in overcoming inflammatory action, the necessity for its continuance no longer exists, and we gradually withdraw its application. If, in spite of cold applications, the morbid action passes into the suppurative process, with a tendency to gangrene, it should be promptly discontinued. It is always better borne in summer than in winter, in young and vigorous subjects than in the old and infirm. Its effects should be carefully watched, as also the changes that take place in the part; as soon as inflammatory accession becomes apparent, and the part is threatened with structural lesion, the cessation should be gradual, from cold to cool, and from cool to tepid, increasing the temperature cautiously until the desired degree of heat is attained. Again, *after* the subsidence of disease, the part becoming weak, lax, and swollen (exudation having subsided), cold, moderately applied, is exceedingly beneficial to stimulate absorption and impart tone to the depressed vitality of the morbid structure. The manner of applying cold is to cover the affected part with a thin piece of old cotton or muslin, folded *only once*, and having been dipped in a vessel of cold water. It is necessary to have the cloth thin to allow free evaporation; and just as soon as the cloth has dried, or its temperature raised to the body, it should be at once reapplied. In those cases where inflammation coexists with a wound, the frequent removal of the cloth will interfere with the healing process, producing irritation of the part. Instead, therefore, of dipping the cloth in water, apply the water with a sponge or another piece of cotton, allowing it to drip upon the part. The inflamed limb should be placed in a trough, or upon a piece of oiled silk or gutta-percha, to favor the flow of water from the bed and preserve the mattress from accumulated moisture. Another method of applying cold consists in the application of ice to inflamed parts arising from gunshot wounds of every kind—a piece of cloth folded two or three times intervening. This was the practice adopted in the United States military hospitals in and about Washington, in the years 1863–64. Inflammation by this process, and when taken in time, was prevented to a very great extent, and, when it had arisen, was quickly and effectually subdued.

Dr. Canniff remarks that "in the vast majority of cases which came under treatment in the Lincoln Hospital, and, indeed, in all the hospitals in Washington, some time had elapsed from the period of receiving the wound until the entrance into hospital. Much inflammation had arisen, yet in every case, whether the wound was in a limb or in the chest, or the abdomen, or the head, the application of ice in the manner above stated had a most decisive effect. The most favorable opportunity presented itself of trying its effects upon a large number who had been *recently* wounded—who, indeed, were transported to hospital within twenty hours of the time of being wounded, and who had received no previous treatment whatever. Among a comparatively large number of such cases, embracing wounds in every part of the body, the ice treatment was pursued, terminating with the most happy results, and in some cases even beyond the most sanguine expectations of the surgeons in charge." If ice can not be procured, the water may be rendered cool by adding one part of alcohol to six of the liquid, or by using a mixture of alcohol and pyroligneous acid; or, what serves an excellent purpose, a strong solution of hydrochlorate of ammonia and nitrate of potash. The efficacy of these lotions depends upon their more rapid evaporation, when exposed to the air, than water alone. Hence, in their use, the parts to which they are applied should be constantly exposed to the air, to favor the process of evaporation.

Warm Applications.—As cold applications are of most value during the incubation of inflammation, so are warm eminently more efficient after the process has been established. At this period they are not only more grateful to the patient's feelings, but they serve an important curative agent in lessening the risk of *metastasis*, favoring exudation from the vessels, and relieving the oppressed local circulation. They are especially adapted to *chlorotic*, *nervous*, and *excitable* persons, who are easily chilled by the application of cold. In such individuals, water of a temperature below 32° Fahr. should never be used, for fear of a sudden transfer of disease from the external to the internal organs of the body. Warm applications effect good results by relieving tension of the congested vessels, impairing tonicity, and favoring exudation through the parenchymatous structure, and diminishing pain and throbbing. After inflammation has reached its acme and begins to

decline, they should be cautiously and gradually withdrawn. At this stage their continuance becomes positively injurious, by maintaining exudation through the dilated condition of the vessels and the relaxation of the intervening structure—a process in direct antagonism to resolution, and, therefore, destructive to health. This is the period when cold is most beneficial; but the change should be made with judgment and care, substituting the hot applications, first for *warm*, then *tepid*, and gradually lowering the temperature until the desired degree of cold is attained.

A good rule to be observed, generally, is to consult the wishes of patients, and use applications of a temperature most congenial to their feelings. Use the application diligently and persistently during the active stage of inflammation, and gradually abstain so soon as the process of decline is fairly established. Much evil has resulted from the injudicious continuance of hot applications after the subsidence of active inflammation. Warm water may generally be advantageously combined with any of the remedies recommended for inflammation and employed as medicated lotions. An application which I have frequently used with advantage is a mixture of warm water and opium, or of the acetate of lead, or of the hydrochlorate of ammonia, being dissolved in the proportion of two drachms of the lead, or an ounce and a half of the ammonia or tinct. opii. to a gallon of water. A piece of old flannel of suitable size and of several thicknesses is moistened with the solution and applied to the part, the whole being covered with oiled silk, to confine the heat and moisture. The compress may be wetted from time to time, by moistening it with the solution from a sponge. Whenever the flannel becomes soiled and offensive by the discharges, new or fresh dressings may be substituted. In persons of delicate skin, the hydrochlorate may produce slight pustulation. In such cases it should be discontinued. In the employment of cold water, the part should be exposed as much as possible; in the use of warm, it is to be closely covered. As cold water does good by constricting the inflamed tissues and opposing effusion, so is the latter beneficial by relaxing them and favoring effusion.

Fomentations are a species of local bathing, and are employed in the following manner: A large, thick flannel cloth, wrung out in hot water, is applied to the part as hot as it can be borne, repeated at longer or shorter intervals, according to circumstances. They

are frequently beneficial in inflammation of joints and of some of the internal viscera, relieving pain, spasms, and tension, oftentimes promptly and permanently. In wounds of the pelvis or abdominal organs they are of essential service, especially during the accession of the inflammatory period.

Medicated fomentations may be advantageously employed whenever demanded, having especial reference to the pathogenesis of each remedy to the leading characteristics of the morbid action. The most simple fomentation consists of a large, thick flannel cloth, wrung out of hot water, or the medicated lotion, at a temperature approaching the boiling point, by means of two sticks turned in opposite directions, and applied lightly to the part as hot as it can be borne. Hops, chamomile flowers, or poppies, may be substituted for the hot flannel. They are to be sewed into a thick flannel bag, immersed in hot water, and applied to the part as hot as can be endured without destruction of the tissues. In employing these processes, it is better to renew them frequently, having *two* cloths, so that one may be applied so soon as the other is taken off, thus preventing the danger of shock and reaction from exposure to air. If the part is intolerant of the weight and pressure required in fomentation, recourse may be had to

Stuping.—This variety of fomentation is applicable to many cases, especially in acute inflammations of the eye, nose, mouth, ear, and throat. The water, having been medicated with the appropriate remedy, is subjected to the flames of an ordinary spirit-lamp until steam is generated. This steam is conveyed from the vessel directly to the part to be encompassed, through a woolen hose about three feet in length and from three to six inches in diameter, kept open at the end by circular rings of wire. Upon this principle medicated steam may be conveyed to any portion of the body by means of a gutta-percha tube attached to a tin boiler and heated by a spirit-lamp; the bed-clothes being tucked around the patient closely, and being of sufficient thickness to prevent the escape of the vapor.

Poultices, or cataplasms, as they are more properly termed, are modifications of fomentations, and are appropriate to inflammation of *wounds, ulcers, abscesses*, and other affections where continued application of heat and moisture is desirable. They are especially suitable for *inflamed ulcers, boils, and abscesses* in the state of development, to assist suppuration, and for *sloughing bruises*,

and are made of various substances, simple or medicated, according to the object they are intended to fulfill. To be productive of real benefit, they should be *thick* without being too bulky, and applied so as to extend *well over the part* to be acted upon. It is necessary to have them renewed before they part with heat and moisture, else they become *irritants*, and lose the good effects which otherwise might have been obtained. They should be changed two or three times a day, and maintained at a temperature of 87° Fahrenheit.

An elegant and convenient substitute for the poultice is obtained by dipping a piece of lint of *three or four thicknesses* into the medicated lotion desired to be applied to the part, and covering it with a large piece of oiled silk or gutta-percha, which retains the heat and moisture and prevents soiling of the bed-clothes. This form of poultice may be advantageously used on those portions of the body where the ordinary cataplasm is too bulky and heavy, as on the thorax or abdomen, in cases of inflammation of the organs within. *Medicated* cataplasms may be employed precisely on the same principles as fomentations or evaporating lotions; and in ulceration or abrasions of the skin, the active ingredient is absorbed and produces its specific action the same as if taken into the stomach. The following is a list of poultices generally used in practice, with a few directions for their preparation:

Bread Poultice.—This poultice is made by pouring boiling water on crumbs of stale wheat-bread, and stirring it to the proper consistence; then spread it upon a piece of folded muslin large enough for the purposes required. In case milk is substituted for water, the poultice requires to be changed more frequently, as it soon becomes sour, and then acts as an irritant.

Arrow-root Poultice is prepared in the same manner as when used for dietetic purposes, only that it is made of greater consistence. It is admirably adapted to *irritable ulcers* and sores, and as an emollient application is hardly surpassed.

Slippery-elm Poultice is made from the powdered or ground bark of the slippery-elm, moistened with hot water, and is adapted to ulcerated and excoriated surfaces.

Linseed Poultice is more frequently used than either of the first-mentioned varieties, and is prepared from the ground flaxseed, mixed with boiling water, until it assumes a pulpy, tenacious mass.

It is the most convenient of all poultices, is soothing and emollient, retains its heat longer than either of the others, and is more easily detached on account of its oleaginous properties.

Fermenting Poultice is made by incorporating together equal parts of yeast and wheat flour, while exposed to the action of heat, until it swells. It is employed in *foul, painful, and fetid* ulcers; in *hospital gangrene*, on account of its antiseptic qualities; and in *mortification*. I have seen most excellent results follow the use of this poultice in the malignant sore throat of scarlatina.

Poultices may be prepared from various substances belonging to the culinary department, among which may be mentioned carrots, turnips, horseradish, etc. This latter esculent is of considerable value in discussing buboes in the early stage of inflammation and previous to the process of suppuration. They may be medicated with any of the indicated remedies mentioned under the head of Local Applications.

Nitrate of Silver.—This remedy was first brought to the notice of the profession by Mr. Higginbottom, of England, as a topical application in the various forms of external inflammations, and used both in the fluid and solid state. Its beneficial effects in inflammations of the *eye, throat, and genito-urinary* organs, have been acknowledged by practitioners of both schools of medicine. Within a few years past, it has been quite extensively used in laryngeal affections, by Dr. Horace Green, of New York, who testifies to the excellent results following this method of treatment. In inflammation of the *tonsils and fauces*; in *gonorrhœa and gleet*; in *spermatorrhœa, vaginitis, and metritis*; in *strictures* and other affections of the urethra, it has been employed with satisfactory results. In *erysipelas*, the allopathic school have used this remedy locally more extensively than any other, iodine only excepted. It is especially indicated in all inflammatory affections of a slight and superficial character, where the morbid action is neither very active nor advanced, and situated not deeper than the integument.

Iodine.—As a so-called antiphlogistic remedy in the topical treatment of inflammatory diseases, this drug was first introduced to the notice of the profession by Mr. Davis, of England. Its action in subduing inflammation is attributed to its *alterative** and

* The so-termed alterative properties seem to depend upon its *excitant* powers in overcoming inflammatory action by inducing a similar excitement.

sorbefacient properties, which change the action going on in the capillaries, and stimulate the absorbents to take up the effused fluids that are extravasated during the morbid process. This action is manifest upon applying it to an oedematous *uvula*, *eyelid*, or the *scrotum*—the effusion disappearing and further exudation being prevented. It is from similar effects that the remedy has acquired such a brilliant reputation in the treatment of *erysipelas* among allopathic practitioners. Its effects are equally lauded in *irritable* and *inflamed ulcers* of the extremities; in *corns*, *bunions*, *whitlows*, *boils*, and *carbuncle*; as well as in *acute oedema* of the *tonsils* and *uvula*, *legs*, *scrotum*, *prepuce*, and *puendum*. Its application is effected by using equal parts of the tincture and alcohol, and painting the parts with a camel's-hair pencil until the tissue assumes a deep yellowish color; and it may be applied once or twice a day, according to circumstances. If the remedy is used too strong, it will produce severe pain and excite capillary action to too great a degree, and increase rather than diminish the morbid action going on in the part. It is also of great service in injecting abscesses, or the hydrocele sac, after their contents have been evacuated. The inflammation aroused by its action favors the deposit of the plastic process, adhering the two walls together.

Pressure, or Compression, is more particularly applicable after declension of inflammation, by giving support to the affected structures, imparting tone to the capillaries, and assisting the process of resolution. It is one of the most efficient and valued means of stimulating absorption, and thus removing deposit, and is applied by means of *splints*, *plaster*, *special compresses*, or simple *bandaging*. It also controls muscular contraction, and thus prevents spasms—a process so valuable in the treatment of *fractures*, *dislocations*, *amputations*, and various affections of joints.

Counter-irritants, as they are termed, as a rule of action should never be applied except during the *formative* stage of acute inflammation. They are remedies which, when applied to the surface of the body, create a new disease, or a new excitement, and in this manner overcome the morbid action going on in the tissues beneath. During the progress of high vascular action, irritation aggravates rather than benefits the local and general disorder. The irritants most in use are *sinapisms*, or mustard-poultices. *Sinapisms* are made by mixing the flour of mustard with sufficient water

to make a pasty consistence, and are retained upon the part long enough to effect redness of the skin. They are, however, but little used in homœopathic practice.

Ammonia.—Aqua ammonia is used for the purpose of vesication, and is applied by saturating a cloth with the liquid and placing upon the part.

Turpentine may be employed in the same manner, diluted with water. It is a powerful vesicant, and has been successfully used as an external preparation in diphtheritic affections of the throat. Coal or rock oil has been similarly used, it is said, with beneficial effects.

Chloroform is frequently used as a topical application, to mitigate pain and excited sensibility in a part. It acts potently and immediately, and is employed as a domestic remedy in neuralgia, spasms, and various painful affections. Its mode of application is by saturating two or three thicknesses of patent lint of the required size, and placing it upon the part; cover all with a piece of thin gutta-percha or oiled silk. It acts with remarkable celerity, and produces severe irritation if long retained.

Baunscheidismus* (Acupuncture).—This process of cure, called Baunscheidismus, consists in using an instrument containing twenty or more slender needles about one inch in length, these needles being concealed within the instrument, which is provided with an appropriate spring, so that the needles may all at once be introduced more or less deep, according to the will of the operator and the necessity of the case. The needles are set in the instrument in the form of a series of circles, and may be applied to almost any part of the body over the seat of a local inflammation; it may be applied in one place only, or as many as may be necessary. Croton oil should be rubbed in afterward to increase and keep up the irritation. This practice will be found of great benefit, especially in pains in the side, back, hip-joints (sciatica), back of the neck, etc. This treatment is not new; it is merely one of the methods of practicing acupuncture, and is of very ancient origin, known by the Chinese and Japanese centuries ago. The term Baunscheidismus originated from its inventor, Baunscheidt, who devised the instrument for the purpose of producing *acupuncture* and *counter-*

* Contributed by T. G. Comstock, M.D., of St. Louis.

irritation. The oil used, we are led to infer, is either an oil of *gnats* or else an oil of *apis mellifica*. It is unnecessary for us to refer to Baunscheidt's book, as it shows the author to be an ignorant pretender; but the instrument is really worth a place in the armamentarium of every surgeon. Baunscheidt has dignified his instrument by calling it a "Lebenswecker" (Life-reviver).

Dr. Comstock informs us that, in the Good Samaritan Hospital, in St. Louis, he has used the instrument for some years past, whenever counter-irritation by acupuncture was desirable, with good results.

Counter-irritants are rarely employed by practitioners of the homœopathic school of medicine; their remedies for the treatment of those maladies for which vesicants are recommended, acting specifically upon the diseased organism, cure them without the necessity of resorting to external means of this kind. The various *destructive* agents used by the old school, such as the *actual cautery* and *camphor moxa*, and similar agents for destroying the human organism, are entirely discarded by homœopaths. In former times, these *destructives* were daily used by the practicing surgeon; and the red-hot iron, fanned to a white heat, was "uniformly found glowing in the furnace, ready for the performance of its accustomed function." The *camphor moxa*, too, ready to do *its* work of local death, and only awaiting the torch of the surgeon to complete the process of destruction, is one of the sad relics of barbarian surgery handed down to us by that school of medicine that boasts "the learning and investigation of all time." This cruel and inhuman practice of roasting the living tissues to cure disease is one of the lamentable evidences of the inefficiency and shortcomings of the chirurgic art. To use the words of a recent allopathic writer, these barbarous expedients were "much too frequently and indiscriminately employed; and even in the present day they may, perhaps, be found smoking in the hospital ward oftener than necessity demands or expediency would warrant."

CHAPTER II.

INFLAMMATORY PRODUCTS AND CONSEQUENCES.

SECTION I.

EXCESSIVE DEPOSIT.

INFLAMMATION gives rise to several products and consequences; the first of which I shall consider is *excessive deposit*, or exudation. As soon as a stasis or retardation takes place in the current of the circulation, important changes go on in the blood itself, and certain of its component parts are exuded. The nature of this exudation is exceedingly diversified, varying in quantity according to the *length of time* the inflammation may have existed, the *intensity of action*, and the *constitution of the patient*.

In ænemic conditions of the system, where the inflammatory action is low, the exuded fluid may consist solely of serum. The fluid in this state is of a light straw color, coagulable by heat, and, in consequence of its containing some albumen, at the ordinary temperature of the body it remains fluid. But in ordinary inflammatory action, the exudation consists of several different constituents, *fibrin*, *albumen*, and *serum* being exuded together. When first exuded, the substance is of a liquid consistence. In consequence, however, of peculiar inherent properties, and also in consequence of the vital energy of the surrounding parts, it soon evinces material changes, by which highly-important processes are gained, viz: the *restoration of parts* — the *organization of structure*; the material for the formation of which is the *coagulable lymph*, or *blood plasma*, as it is termed. The changes consist in this: The exuded liquid gradually congeals, forming a simple homogeneous and hyaline mass, presenting, at this period, nothing like *growth*. Soon, however, minute granules, or dust-like specks, begin to

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appear, and they gradually increase and congregate. Next, these spots become surrounded by a thin and delicate membrane, containing a liquid; and this is the process of cell-growth, by which all living structure is formed. The plasma, at this stage of development, is called by anatomists the "*blastema*." The small granules are adherent to the internal surface of the cell membrane, and are called "*nuclei*;" and within these are still smaller granules, or "*nucleoli*." But in order to insure permanence and perfection of structure, it is expedient that the deposit be supplied with blood and blood-vessels. Thus is the process of vascularization begun; blood corpuscles are seen coursing each other through the plasma in new blood-vessels, coming from and returning by the vessels of the adjacent original structure. These new vessels, according to some physiologists,* are, as it were, self-formed in the plasma. Nucleated cells send out radiating processes, which elongate, communicate with each other, and finally about upon the older and previous capillaries. These, uniting with the newly-formed vessels, dilate and begin to receive blood corpuscles from the older ones; in turn transmitting the circulation to others, formed in the same way, in the lymph beyond them. Thus, a canal is formed, continuous with original blood-vessels on either aspect, and circulation is established within it. Other theories exist in regard to this process; but to the practical surgeon the question is of little importance. In whichever way formed, the new capillaries are at first composed of simple membrane, enlarging afterward—acquiring fibrous tissue in their walls, and finally being converted into arteries and veins. This is the foundation of all development. Whenever cells begin to appear, if their growth be not interrupted, some structure, more or less organized, will be produced. By this process parts are restored, and in this manner all tumors increase.

Fibrin, more or less plastic, exuded on the free surface of a membrane, is termed false membrane; assuming, in the first instance, a structural arrangement resembling that of the buffy coat of the blood, and ultimately forming a layer or coating similar to the original and invested tissue. When accompanied by purulent or sero-purulent secretion, it is an attendant on true

* See Bennett on Inflammation.

inflammation; but alone, or attended by serous effusion simply, it is the product of an amount of disease short of true inflammation. When of truly inflammatory connection, as indicated by the coexistence of purulent or sero-purulent deposit, it is usually of low organization, and is to be regarded as analogous not to the simple adhesion of a wound, but rather to the partially-organized fibrinous exudation which precedes and limits the purulent secretion in an ordinary abscess. Fibrin may be exuded in the *interior* of the part; and, being at first fluid, it insinuates itself so as to fill up every minute space, occasioning enlargement—cohesion being generally impaired. If the disease is *acute*, the part is *soft* as well as swollen, a considerable proportion of the serum being mingled with the fibrin. If the disease be slight and gradual, *induration* is found instead of softening; the serum having been absorbed, and the fibrin slowly assuming a higher and more permanent organization. If such disease continue in a chronic form, a serious change is effected in the structure of the part: it becomes indurated, thickened, and enlarged; if the morbid condition continue, plastic deposit increases in greater quantities than can be absorbed; enlargement and change of structure gradually increase, giving rise to the formation of tumor. Exudation may take place both on the surface and in the interior, as into the texture and on the exterior of a serous membrane, or on the surface of such a membrane, and into the parenchyma which invests it. Thus, we see that fibrin exuded during inflammation undergoes various changes, according to the grade of disease which produces it. It may soften and be absorbed, the part regaining its natural formation and structure—*resolution*; or, the inflammatory process subsiding, it may remain and become organized; or, the disease progressing, the plasma may undergo further changes, softening and degenerating into pus. During true inflammation, advance in organization ceases; and upon its subsidence it may be resumed. All fibrin, however exuded, is of a low and imperfect organization, and exceedingly prone to destruction—first, by absorption; and, secondly, by a continued accession of such disease, advancing to suppuration, softening, and ulceration. This is *favorable*, as regards the discussion or disintegration of simple enlargements of inflammatory origin; *unfavorable*, as regards reparation of solutions of continuity; and hence it is that the cicatrix by granu-

lation is frequently opened, the wound gaping as before; while union, either by adhesion or by the slow "modeling process"—into whose composition true inflammation does not and can not enter—remains comparatively firm and enduring.

SECTION II.

SUPPURATION.

The second consequence of inflammation is *suppuration*. In all works on pathology, suppuration is spoken of as one of the terminations of inflammation, and not its consequence. The only true termination of inflammation, as before remarked, is *resolution*. Suppuration must therefore be regarded as its result, and is that process by which the peculiar fluid called *pus* is formed. This must be studied with regard to its *properties*, to the *manner* of its *formation*, and to its *subsequent changes*. When minutely examined, it is found to possess many properties in common with blood. It is a liquid of an opaque cream color, of a viscid consistence, and of various specific gravities. When exposed in a vessel, it coagulates like blood; the lower strata consisting of pus corpuscles and granules; and the supernatant fluid, the liquor puris, being more or less transparent and serous, frequently contains some accidental constituents. The pus corpuscles differ in many essential points from the corpuscles in the blood. They are larger than the blood corpuscles, but possess the same fundamental principles as the organic cell—a cell containing a nucleus and nucleolus. In an inflamed part, there are pus cells and organic cells intermingled, the proportion of each being dependent upon various circumstances, such as the stage of the disease, its intensity of action, the nature of the inflammation, and the predisposition to take on one or other form of action. It is not always the case that pus is formed in the ordinary process of inflammation, as, for example, in the ordinary adhesive inflammation accompanying the healing of simple wounds.

Whenever purulent matter is thrown out into the substance of an organ, it at first consists of a number of globules, cell granules, etc., diffused throughout the cellular tissue of the part. There is, in the conservative powers of nature, a disposition to the collection of these into a circumscribed mass, forming what is known as abscess.

SECTION III.

ABSCESS.

Abscess may be defined as "a collection of pus in the substance of an organ." Were it not for certain changes preservative of structure, pus would tend to diffuse itself widely, and thus lay the foundation of serious mischief. Nature has wisely provided against this difficulty; for, by the very irritation that is kept up by the formation of pus, a plastic, organizable lymph is thrown out, which renders the areolar tissue impermeable, and a membrane is formed around the pus, so that the only mode by which the abscess can extend is by pressing upon and distending this membranous wall. This is what is termed a *circumscribed* abscess. The pus in the abscess continuing to press more and more on the internal surface of the membrane, it becomes smooth and polished; and from its having been supposed to possess the power of taking upon itself the formation of pus, this membrane has been termed the "*pyogenic membrane*." The formation of this membrane interferes greatly with the healing of chronic abscesses, and hence the difficulty and disappointment that so frequently ensue in the operation for fistulæ, etc.

By certain conservative powers inherent in the organism, a tendency to diminution is produced. If the abscess is near the external surface, the intervening portion is gradually broken down and absorbed, and in this way the abscess is emptied. If it is nearer one of the cavities of the body, by the same process it is emptied there. The formation of pus does not take place in cellular tissue alone. It is often found on the mucous and serous membranes of the body, the skin, etc., and is always seen on granulating surfaces, enveloping and protecting the granulations from external injury. Sometimes it happens that pus is formed deep in the tissues, and can not find its way externally by any orifice. Here nature avails herself of other resources; for the pus is taken up through the absorbents, carried into the circulation, and is thrown out of the system through the channels of the various secretions. Do not suppose that pus globules, or purulent matter, actually enter into the blood. Pus can never be absorbed as such. The pus cells, granules, etc., must be broken down, reduced to a liquid state, and

resolved into their primitive elements; for it is only by a change of this kind being effected that the material can be acted on by the absorbents. The question now arises, How is pus formed? It is produced, says a recent authority, by the same process by which organized cells are developed—circumstances, only, modifying the results in the two cases. Exudation having taken place, and the vital powers being either below their healthy standard or perverted in their action, the globules take upon themselves the character of pus-cells—“*an abortive attempt at cell formation.*” These cells are unfit for any of the purposes of the constitution, and, being extraneous matter, require elimination.

Abscesses are divided into several varieties: *First*, we have **acute** and **chronic** abscesses; *secondly*, as suppuration depends upon a variety of causes, they are again divided into **common** and **specific** abscesses; and *thirdly*, as the result takes place at the point of attack, or at some remote locality, they are again subdivided into **primary** and **metastatic**. *Abscesses* sometimes suddenly appear in a locality where twenty-four hours before there were no evidences whatever of inflammatory action. Abscesses also appear at a point quite remote from a suppurating surface; for example: after a surgical operation, the patient will suddenly complain of dyspnoea, with all the evidences of pulmonary congestion; and after death, abscesses in the lungs are found to have existed. It was formerly believed that this pus was conveyed to the lungs by transportation, but the error will be discovered by the fact that *pus* can never be absorbed as such. Again, after operations about the anus, symptoms of gastro-hepatic inflammation frequently present themselves, and, if not controlled, will soon be followed by abscesses in the liver, caused, it is alleged, by phlebitis—the inflammation extending through a vein or veins near the anus, by continuity of surface, until it reaches the portal vessels; just so are the abscesses accounted for that take place in the lungs from various causes. Deaths from *pyemia*, following amputations, may be produced in the same manner. There is another variety of abscess very nearly allied to the chronic, with which, indeed, it has been generally confounded, though there are very palpable differences between the two conditions: I mean the *lymphatic abscess*, so called from the lymph-like character of its contents. Under this head we notice two allied affections—the *lymphatic tumor* (tumor

lymphaticus) and the *lymphatic abscess* (abscessus lymphaticus). The *first* is a *soft, indolent tumor*, variable in size, with but little alteration in the sensations of the part, and without notable discoloration of the skin; deriving its origin from rupture or erosion of one or more of the lymphatic vessels, and extravasation of lymph into the cellular tissue, either beneath the skin or fascia. The *second* is a *true indolent abscess*, sometimes small, frequently acquiring a large size; irregularly circumscribed, apparently formed without any very palpable evidences of pre-existing inflammation; and, in the earlier period of its development, merely characterized by an unpleasant feeling of pricking and tension, increased by motion. The contents of these abscesses are variable—sometimes a glassy, almost transparent, fluid; at other times turbid, or mixed with flakes; and occasionally with small darkish or whitish colored particles, which form a kind of sediment.

In both cases the development of the disease is very gradual, and sometimes it is almost imperceptible; and cases not unfrequently occur in which an affection of this kind is several months, or even years, in running through all its stages. As the volume increases, the surrounding parts in the vicinity of the fluid collection become more and more indurated; and beyond that limit, the cellular tissue, after a time, becomes infiltrated and œdematous, as does the tumor itself; but the skin still retains its natural color and temperature. This induration forms a barrier, limiting the fluid contents of the tumor, and as the disease progresses the whole cavity becomes lined with a somewhat dense, uneven membrane, possessing but little vascularity, which then becomes a kind of secreting surface. As yet there is little or no fluctuation, especially if the collection be deep-seated, and there is but little local or constitutional disturbance. Sooner or later, however, the swelling increases; the tumor becomes more prominent and expanded; pain, uneasiness, or stiffness are now conspicuous; the skin becomes more tense, assumes a red color, and becomes more sensitive; the surrounding œdema is more diffused; the sac, as well as the adjacent parts, take on an obscure grade of inflammation; and the contents of the abscess, which previously were almost transparent, or lymph-like, now assume more or less of a purulent, sanious, or curdy appearance, and sometimes become exceedingly offensive. The superimposed structures are gradually absorbed, the matter progresses toward the

surface, the skin becomes more and more attenuated, and the abscess finally opens and discharges its contents. In some instances this event does not take place until the tumor has attained the size of the fist, or even the head of a child. Coincident with these discharges, the constitutional symptoms undergo a corresponding increase; the countenance becomes pale, sallow, and haggard; the appetite depraved and capricious; the digestion enfeebled; the secretions perverted; and the whole function of nutrition seriously impaired. Finally, as the disease advances, febrile exacerbations occur toward night, followed by exhaustive sweats; emaciation and general prostration rapidly supervene, and the sufferings of the patient are often terminated by confirmed hectic and colliquative diarrhœa.

Lymphatic tumors and *abscesses* may form upon any part of the body; but their most frequent seat is upon the back, between the shoulders, in the neighborhood of the axilla, about the neck, or upon the thigh or leg. They occur generally singly, but sometimes multiple; and in the latter case several may form at once, or consecutively.

The causes of this affection are of course variable. The proximate cause of lymphatic tumors has been stated to be a rupture or opening of one or more lymphatic vessels, and the consequent extravasation of lymph into the cellular tissue. This may arise either from violence, or from changes accruing spontaneously, or over-distention of the vessels from obstruction, or a diseased state of their tunics, or softening, ulceration, etc. Lymphatic abscesses always occur in a depraved state of the constitution, in which the plastic powers are depressed under the influence of a general cachectic diathesis.

The subjects of the disease are almost always feeble, pale, sallow, and incapable of much exertion; and in many of them there exists palpable evidence of a general state of *venosity*, or *venous plethora*, which, by impeding the easy ingress of the lymph and chyle into the venous circulation, throws it back upon the minute radicles of these vessels, and thereby gives rise to undue distention and other derangements, which finally lead to the development of these tumors and abscesses. These affections must not be confounded with bursal tumors, chronic abscesses, or those which depend on metastasis; and if we pay attention to the position, mode of

formation, contents, etc., it is hardly possible to make such a mistake. The prognosis in all cases is only unfavorable in proportion as the abscess is large and the constitution seriously deteriorated.

Treatment.—The treatment of lymphatic tumors and lymphatic abscesses, although differing essentially in their mode of origin, yet having the same terminations, is to be conducted upon the same general principles. The indications are, *first*, to disperse the tumor where this is possible; *secondly*, to change its condition, so as to impress upon it the character of a common purulent abscess, and to evacuate its contents; *thirdly*, to arrest the discharge and promote the healing process; and *fourthly*, to rectify the faults of the constitution. In slight cases, the first indication may be fulfilled by stimulating applications, such as *iodine*, *mercurial plasters*, and *camphor*, horseradish cataplasm, *adhesive strips*, and *pressure* by a graduated compress and bandages. It may be necessary in most cases to use constitutional means, by administering those remedies that exercise a specific action upon the structures affected. These will be discussed hereafter. The second indication will demand either puncture or incision, according to the character of the case. Where the tumor is small and recent, it may be laid open with the bistoury, afterward filling the cavity with lint. In large lymphatic abscesses, it is better to puncture with a trocar, and, after drawing off the contents, to inject a lotion of calendula, hydrastis, or iodine, and permit it to remain for some time. Some surgeons have recommended injections of scalding water, while others have praised a diluted solution of the acid nitrate of mercury. In using the latter remedy, I would recommend a free opening of the cavity; then fill it up with a pledget of lint moistened with a diluted solution of the acid. After the tumor or abscess has been evacuated, it often becomes necessary to resort to some means of arresting the discharge and obliterating the cavity. In cases of lymphatic tumor, when a vessel has been ruptured and continues to pour out lymph, it may be necessary, in order to arrest the discharge, to apply either caustic or a strong solution of the persulphate of iron to the orifice of the gaping vessels, or the hemostatic agents recommended in article on Local Anæsthesia, page 143. Stimulants and excitants may also be applied to the lining of the cavity, to excite granulation and the healing process. I know of no remedy better fitted to fulfill this

purpose than an aqueous solution of tincture of calendula. Hydrastis Can. is another important remedy, as applied to suppurating surfaces, or the cavities of abscesses when their contents have been evacuated.

The last indication relating to the defects of the constitution is really the most important indication to be met in the treatment of all cases of this character. It consists in the administration of those constitutional remedies which rid the system of all noxious agents by imparting tone and vigor to the whole body physical. These are calc. carb., calc. phosph., silicia, hepar sulph., iodine, sulphur, arsenicum, nux vom., china, etc.

SECTION IV.

VARIETIES OF PUS.

There are several varieties of pus, which have been designated *healthy*, *serous*, *curdy* or clotty; *mucous* or muco-purulent matter; *concrete* or lardaceous; *putrid* and *specific* pus. To *healthy* pus I have alluded heretofore; it resists putrefaction for a long time, and is the product of healthy inflammation in the part. It is yellowish, creamy, and laudable.

Serous Pus is thin, almost transparent, and reddish. It differs from healthy pus in containing very little fatty or fibrinous globules, and in being the product of a low grade of inflammation in weak or debilitated constitutions.

Curdy or Clotty Pus resembles the serous, but has numerous white clots or flocculi of coagulated fibrin floating in it. Under the microscope it displays the globules of healthy pus and numerous other particles of irregular shape. It contains very little fatty matter, and is commonly found in scrofulous abscesses.

Mucous Pus, or Muco-purulent Matter.—The mucus which proceeds from healthy mucous membranes, as seen under the microscope, is composed of abridged epithelial cells—flat, irregularly five-sided, and with a certain nucleus—with numerous granular masses and a few spherical bodies, very like pus corpuscles, except that these contain fewer air globules. Under inflammatory action there is an increased exudation of albuminous liquid; the quantity of globules is greatly increased, and they acquire the exact character of pus

globules. The characteristic differences between mucus and pus have been made the subject of much research and study by Simon, who arrived at the following conclusions: *Pure mucus* floats on water for a considerable time, especially if air bubbles are entangled in it. *Purulent matter* swims if it contains air bubbles, but allows the pus to deposit itself; the deposit frequently takes place in the form of pendent fibers. If pure mucus contains no air bubbles, it sinks *gradually*, but pure pus sinks *rapidly*, to the bottom. *Pure mucus*, in water, appears as a homogeneous, tenacious mass of a *whitish-yellow* color. *Pure pus* forms a stratum at the bottom of water, and is of a *greenish-yellow* color. *Pure mucus* imparts no albumen to water, except when largely mixed with saliva. *Pure pus* communicates a *large* amount of albumen to water.

Concrete or Lardaceous Pus may either consist of common pus, thickened by the absorption of its watery parts, in consequence of having remained for a long time in a chronic abscess or bony cavity—as the antrum and nasal sinuses—or it may originally be secreted in a thick condition; and in this latter case differs little or nothing from melicerous and æthromatous matter found in wens or encysted tumors.

Putrid Pus has a fetid smell and alkaline reaction, in consequence of the presence of hydrosulphate of ammonia, which is formed by the decomposition of albumen when pus is exposed long enough to air and heat.

Specific Pus, capable of producing the venereal disease or the small-pox, may not differ in its sensible qualities from the healthiest, but must include some matter in a peculiar state of decomposition; which state is capable of imparting its own properties to other living matter. The *pus* from spreading or phagedenic ulcers and cancers is thin and serous, containing blood globules, shreds and debris of the ulcerating tissue. It is said to be *ichorous*, when thin and acrid; *sanious*, when thin and bloody; and *grumous*, when mingled with dark, half-curdled blood.

The principal remedies employed in the treatment of suppuration, and which may be used both internally and externally, are the following:

For Bloody Pus—The most appropriate remedies are: Asa., hepar sulph., merc., ars., carbo veg., nit. acid, sil., and sulph.

For Ichorous Pus—Ars., asa., chin., merc., rhus tox., creosote, phosph., iodine, and sulph.

For Fetid Pus—Ars., carbo veg., china, hepar sulph., sil., sulph., graph., lyc., nux vom., and phosph. acid.

For Corrosive Pus—Ars., caust., merc., nit. acid, sil., rhus tox., sepia, petroleum, nat. mur., lyc., and sulph. acid.

SECTION V.

U L C E R A T I O N .

Ulceration is that process by which a solution of continuity is effected in a living solid; it is of much more frequent occurrence in the cellular and adipose tissue than in muscles, ligaments, nerves, or blood-vessels. The observations of the most recent pathologists have shown that ulceration consists in the progressive softening, disintegration, and removal of successive layers of the ulcerative tissue, being either preceded by inflammation of the ulcerating part or by congestion—that is, by a stagnation of venous blood in the capillaries. This opinion is opposed to the Hunterian theory, which was generally received until later authorities proved the error of his reasoning. The doctrine as taught by Hunter was “that ulcers are formed by a species of absorption,” which he called ulcerative; the substance of his theory being that “the ulcerative tissue, feeling its want of vitality, causes itself, as a last act of life, to be absorbed by its own lymphatics.” There is every reason to believe, however, that ulceration may be more properly regarded as a *molecular death*—a gradual softening and disintegration of tissue, molecule by molecule—the effete matter being mixed with purulent or other secretions of the part, and thus carried out of the system. This process is generally one of true inflammation, or is, at all events, connected with some grade of the inflammatory process.

Certain tissues are more prone to ulceration than others; skin, mucous membrane, and areolar tissue, are peculiarly liable to be attacked, while the nervous, vascular, and fibrous tissues, resist it strongly. The more active the ulcerative process and its accompanying disintegration, the less laudable is the purulent discharge. Inflammation either persisting or advancing, the discharge becomes

thin, acrid, and not unfrequently bloody and more or less impregnated with the softened *debris* of texture; when, on the contrary, the disease has not only departed from the inflammatory standard, but is becoming insufficient even for reparation, the discharge is almost entirely serous. Ulceration is termed *acute* when it advances steadily with moderate inflammation, and possessing considerable power of control in the part; *inflamed*, when the excitement is higher, destruction more rapid, painful, and accompanied by greater redness, heat, and swelling; *phagedenic*, when the excitement is still higher, combined with less local power, with destruction so rapid that the part seems to be consumed by some unseen power. The constitutions most liable to ulceration are those which are debilitated by intemperance or privations, tainted with syphilis or scrofula, or broken down by the excessive use of mercury. This latter is probably the most prolific cause of ulceration; and the comparative unfrequency of these processes among those who employ homœopathic medication has been the subject of remark by many who practice that system of treatment. Future observations, no doubt, will fully justify this conclusion. The parts most prone to ulceration are those in which the circulation is most weak and languid, such as the lower extremities, and more especially if their venous current is in any way impeded by a varicose state of the vessels. On this account it is said that tall persons are much more frequently afflicted with ulcers of the legs than short ones. On the authority of Dr. Young, it is stated "that twenty-two out of one hundred and forty-five tall men, and only twenty-three out of two hundred and seventy-six short men, were discharged from a regiment in the West Indies, in four years, on account of ulcers.

Parts newly formed are more liable to ulcerate than those of original formation; but all the textures of animal life are liable to be attacked. Ulceration is one grade beyond suppuration. The inflammatory process having reached its climax in infiltration and partial softening of the textures, if ulceration supervenes the molecules become further softened and carried away with the discharge from the part. The process by which an ulcerated surface is repaired is termed *granulation*; and the covering of these granulations with cuticle, or the absolute healing of the part, is called *cicatrizatio*n. These two actions, when united, are termed *healing by the second*

intention. *Healing by the first intention*, or *adhesion*, can not take place after inflammation has reached its acme, on account of the breaking up of the textures, which is produced by the diseased action. The process of adhesion is the nice adaptation of two cut surfaces; the liquor sanguinis exudes, the serum is carried off, and the fibrin remains, which in time becomes fully organized, and adheres to the surfaces of the wound—and healing by the first intention is effected. *Healing by the second intention* (granulation and cicatrization) is the process by which ulcerated surfaces are repaired, and wounds in which there is much loss of substance are healed. The granulations are deposited in layers, and the liquor sanguinis mingles with the abnormal secretions, and is carried off while the ulceration is progressing; but as the inflammation ceases, a portion of the fibrin remains and becomes incorporated with the original tissue, forming *granulations*, which are small, red, irregularly-raised points, vascular and fleshy. The liquor sanguinis continues to be exuded, and new layers of granulations are formed upon the old; while the pus, which still continues to be poured out, serves as a covering to protect the whole. As new layers are forming, the old ones become organized, and, the process continuing, the cavity becomes filled up. The means by which the new integument is, as it were, ingrafted upon the granulations, from the thin outspreading of cuticle to the formation of true skin, is called *cicatrization*. When the healthy action appears to be arrested, the granulations are termed *unhealthy*. The same causes that produce inflammation are also productive of ulceration. Ulceration is the medium between suppuration and gangrene. In the former the action does not proceed far enough to the disintegration of the parts; and in the latter the death of the part is effected in mass, by the cessation of vital action. This takes place suddenly, and the part is decomposed by putrescence.

Varieties of Ulcers.—It is exceedingly difficult to give a comprehensive definition of the term *ulcer*; nor is it at all necessary for the purposes of treatment. For all practical purposes it is only necessary to state that an ulcer is defined to be a chasm on the surface of any organ, caused by the destruction of a portion of its substance by disease, or by an injury which has not been repaired. Authors make many varieties of ulcers, according to their *appearance*, *progress*, and *effects*, but I have thought it best to simplify

and arrange them under three distinct heads: 1. Those that are in a state tending to reparation, as the *healthy ulcers*. 2. Those in which the surface has an imperfect form of organization, under which they may be incapable of healing, though they are not necessarily spreading, as the *weak, irritable, indolent ulcers*. 3. Those which are under the influence of the destructive process that originally formed them, and which is causing them still to spread, as the *specific and phagedenic*.

The Simple or Healthy Ulcer.—This species of ulcer is nothing more than a *healthy*, granulating, and cicatrizing surface. The granulations are red, small, numerous, and pointed, and yield a moderate secretion of healthy pus. Its surface has a florid appearance, without any offensive smell. The pus is *laudable* and easily removed; is *thick, creamy*, and easily detached from the granulations. The edges are smooth, and covered with a white, semi-transparent pellicle, which is gradually lost on the margin of the granulations. It heals spontaneously and regularly, leaving little or no trace of having existed. An example of the healthy ulcer is the common boil, which, if not an evidence of good health, is certainly not opposed to such a state, and is a successful effort of nature to rid herself of some slight obstruction or impurity.

Fig. 132.



The healthy ulcer; in process of cicatrization. Pellicle of new skin represented around the margin.

Treatment.—The only topical treatment required in this form of ulcer is a little dry lint, if there is much discharge, or the calendula dressings. The part should be kept in a state of rest, and in a position to relax the muscle upon which the ulcer is situated. Milk and tepid water in equal parts may be applied to the part by means of a pledget of lint frequently wet with the mixture. If the granulations are too luxuriant, they may be touched with nitrate of silver and dressed with dry lint. If the granulating surface is quite extensive, and the preceding applications disagree with it, as sometimes happens in certain kinds of constitutions, it then becomes necessary to form a *scab* on the surface. This may be done by exposing it to the air and covering the surface with carded lint. Sil., hepar sulph., calc. c., lyc., iodine, ant. crud., arn., and calc. phosph., may be given internally, according to circumstances.

Irritable Ulcer.—The irritable ulcer is a variety of the second class, and is very sore to the touch, bleeds easily, and is almost always preceded by an irritable state of the system. The digestive

Fig. 133.



The irritable ulcer; dark; almost passing into the phagedenic.

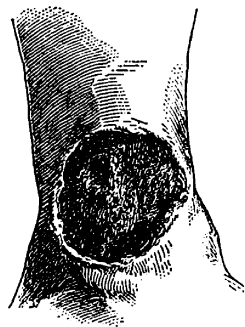
apparatus is often impaired in those persons afflicted with irritable ulcer, and on this account these ulcers are more frequently met with in the higher walks of life, and among those who have indulged too freely in eating, drinking, and other excesses. It generally appears dark and angry, and discharges a thin, ichorous, or sanious fluid, and sometimes so acrid that it excoriates the surrounding skin with which it comes in contact, Fig. 133. Its granulations are imperfectly developed, and in some instances entirely wanting; and in lieu of them may be found a dark, red, spongy mass, having a whitish vesicular appearance at different points, which is extremely sensitive, and bleeds at the slightest touch. It is bounded by a sharp, ragged edge, which may be undermined by the ulcerative process, and is termed "serrated." The parts contiguous to the ulcer are swollen and oedematous.

Treatment.—The *external* remedies appropriate to this kind of ulcer are hamamelis, calendula, hydrastis, pulsatilla, and aconite; either one of which may be used, according to its characteristics, by mixing one part of the remedy to six parts of pure water, and, wetting a piece of lint with the lotion, apply to the part gently, and keep it *in situ* by a single-headed roller. If the ulcer is situated on the leg, the patient should be placed in bed with the limb elevated. Dr. Sargent says: "Too much stress can scarcely be laid upon the importance of perfect rest of the part, in the treatment of ulcers. If the lower extremity be the seat of the disease, a fracture-box will be found to be the most convenient apparatus for the fulfillment of this indication; a pillow protected by a piece of oil-cloth, upon which bran or cotton is spread to imbibe the secretion from the ulcer, should be placed in the box, and the limb laid upon it and secured by closing the sides of the box, the foot being attached to the foot-board. If the arm be the part affected, it should be placed upon a splint and confined by a bandage, so applied as that no undue pressure shall fall upon the ulcer." The sore should be bathed *very gently* once or twice a day

with warm or cold water, according to the feelings of the patient. Dr. Druitt recommends the poppy lotion, applied warm, by means of pieces of lint covered with oil-silk, and changed three times daily. If the patient is feverish, with restlessness, etc., much benefit will be gained by the administration of aconite; if the bowels are constipated, with furred tongue, nux vomica; and if sickness of stomach (nausea), ipecac, or ant. tart. The constitutional symptoms will have to be treated by appropriate remedies, and are the all-important indications in the proper conduct of the disease.

Indolent Ulcer.—This is, perhaps, the most common of all ulcers, is most frequently found in the lower extremities, and at a somewhat advanced age. It is invariably of secondary formation. The sore may in the first place have been of the healthy kind, secondarily inflamed, and perhaps irritable; then weak, and ultimately indolent, in consequence of the cicatrization having been opposed and long delayed by the situation and size of the ulcer, and by the accidents to which it may have been exposed. From such considerations, it is obvious that these sores are more frequently found among persons belonging to the lower class, or laboring people, who are impelled to daily toil, and who have little time to devote to the treatment and cure of the sore in its earlier stages. So frequently, indeed, is this ulcer seen among our industrial classes, and so peculiar is it to this portion of the community, that it is known to many, in and out of the profession, as the “poor man’s sore.” The surface of the ulcer is excavated, smooth, pale, and glossy, and generally void of granulations. These granulations, when they do exist, are insensible, of a dull, pale color, and are situated at the bottom of the excavation, partaking in a great degree of the fungoid character. The edges are elevated, rounded, smooth, thick, and everted, giving to the ulcer the appearance of a deep excavation, Fig. 134. The discharge is thin and serous, containing a small quantity of fibrin, which is exuded, and passes off in the form of pus, or a bloody sero-purulent fluid. The surrounding integument is swollen and discolored by passive congestion. The sore has the

Fig. 134.



The indolent ulcer on the ankle. Usually the cutaneous margins are less irregular than in this instance.

appearance of a patch of pale mucous membrane set in a dense, high ring of cartilage. There is but little pain experienced, either in the ulcerated surface or yet in the margin—indeed, so trifling that the patient will continue his labor for months and years with little or no annoyance. It is on this account that such persons do not present themselves for treatment until the ulcer has attained considerable dimensions. This species of ulcer is in many particulars the opposite of the *irritable*. The edges of the sore in one are *inverted*, in the other *everted*. The granulations, instead of being *red, sensitive, easy to bleed*, as in the *irritable*, are of a dull, pale aspect, rounded, and situated in the bottom of the excavation.

Treatment.—The local treatment of this species of ulcer has embraced a variety of plans, many of which have failed, and a few only have proved of sufficient importance to be retained as really curative. The general rules of treatment to be observed are, cleanliness, moderate exercise, and the adaptation of those constitutional remedies which may overcome the disposition to the diseased action; whenever the patient is not exercising, the limb should be placed in a horizontal posture, or in a position even slightly elevated. In all varieties of ulcer it is proper to use as a topical application the same remedy that is given internally. Before the remedy is applied locally, it is best, particularly when the ulcerated surface is foul, to wash the parts well with a strong solution of castile-soap and water, using a soft sponge or piece of linen, until it appears fresh and clean; or a weak solution of chloride of lime, or the sesqui-carbonate of potash, if there is much fetor about the part. After thoroughly cleansing the sore, a number of pieces of lint, *soaked in nitric-acid solution*, should be laid upon it, covering all with a soft, warm poultice; or, in lieu of the cataplasm, warm-water dressings may be used. These applications should be made morning and evening, until granulations begin to be developed, and the discharge becomes healthy. During this period the patient should preserve the limb in a horizontal position, and take one or more of the remedies as advised hereafter. After the surface becomes clean from the treatment already spoken of, the following mode of dressing may be adopted: First, lay strips of lint on the sore, saturated with the nitric-acid or the zinc lotion; then apply strips

of adhesive plaster about one inch wide, beginning an inch below the ulcer and extending an inch above it, applying them *two-thirds around the limb*, as indicated by the annexed plate;

Fig. 135.

next, a compress of soft linen should be placed over the plaster, and all covered with a single roller, evenly applied, commencing from the toes, and carrying it two or three inches above the ulcer. It is to be observed that the bandage is to be moderately tight at the commencement, gradually loosening it as it as-



Strapping of the indolent ulcer shown.

cends. The frequency with which these dressings are to be applied depends on the quantity of the discharge; if *profuse*, it is better to have them changed daily; if not, from three to four times a week will suffice. Lotions of calendula, hydrastis, and hamamelis, may be advantageously substituted for the zinc and nitric-acid mixtures, as heretofore mentioned, and the subsequent treatment conducted as before.

Dr. Helmuth has employed, with a good deal of success, an application of chalk and calomel, covering the sore with the powder to the depth of one-eighth of an inch, then filling the chasm with finely-powdered chalk, and applying the straps and bandage as stated. Dr. R. E. W. Adams, of Springfield, Ill., extols highly, as a dressing for such ulcers, Pond's Extract of Hamamelis. Prof. R. Ludman, of Chicago, recommends the third trituration of arsenic, sprinkled upon the ulcer morning and evening.

Cerates of opium, balsam of Peru, oxide of zinc, and the nitrate of mercury, are highly recommended, particularly the latter, on account of its cicatrizing properties. I have but little confidence in the various kinds of salves and ointments so highly extolled in the treatment of ulcerated surfaces, as they militate against the observance of perfect cleanliness, and really, in my opinion, do more harm than good. *Rest* is a matter of paramount importance in all cases where a rapid cure is desirable, and I am convinced,

from a large experience in the treatment of ulcers, both in military and civil practice, that it is the most reliable and effectual method of cure, conjoined with constitutional treatment. I have witnessed the most inveterate and indolent ulcers succumb under *cleanliness, rest, and constitutional* homœopathic remedies, that have withstood the whole armamentaria of scores of allopathic physicians. In obstinate and intractable cases, much benefit will be derived by lightly sprinkling the surface with the second trituration of nitrate of silver, or with the collodiated iodine* applied to the part and covered with the roller, as before stated.

Before concluding this subject, it is of importance to add a few suggestions concerning the proper method of dressing ulcers. As a general rule, all rude manipulation, unnecessary handling, or protracted exposure, must be avoided. The ulcer should never be wiped, or touched with the finger, especially if it be of the irritable variety, but the ablutions should be either with warm or cold water, and gently squeezed over the sore from a sponge held several inches above it, the limb being carefully supported over a proper receptacle; after the secretions have been removed from the surface, the surrounding integument should be thoroughly dried, and the dressings reapplied.

It sometimes happens that a large extent of integument is destroyed by the ulcerative process, the morbid action having a strong disposition to reappear after cicatrization, and this continues as often as the surface is healed. To remedy this, Dr. John Watson, of New York, proposed an operation to cover the breach by borrowing the requisite amount of tissue from the immediate neighborhood, and adapting it to the chasm, as in ordinary plastic operations. This procedure has been termed *elkoplasy*, and is strenuously advocated by Professor Hamilton,† of New York, in an article upon the subject. To insure union of the edges of the flaps, the part should be entirely free from inflammation, and the general health be as near as possible up to the natural standard. The flap, like all plastic operations, should be larger than the gap, on account of shrinkage, and be

* This is prepared by mixing with the collodion as much iodine as the fluid will take up. It is an elegant preparation for indolent ulcers, and easily procured.

† New York Journal of Medicine, 1854.

well secured by the interrupted suture; care being taken to avoid pressure on the newly-adapted parts.

The Varicose Ulcer.—This ulcer occurs in consequence of a varicose enlargement of the veins of the leg or thigh, and is owing to a diseased state of their coats. The free return of blood is greatly impeded, and, by producing continuous venous congestions, the parts are weakened and rendered prone to ulceration. They are generally situated above the ankle, are three or four in number, and, by preference, occupy the inner side of the leg. They are oval in appearance, indolent in their progress, and neither extensive nor deep. In fact, they resemble very closely the indolent ulcer in its more advanced stage. The branches and trunk of the saphena vein are enlarged, and the varicose condition of the vessels prevents its healing; or it may cicatrize for a short time and then break out again into a running sore, and thus continue until the cause of the mischief is destroyed. There is more or less pain attending this variety of ulcer, which is of a deep-seated, aching character, extending upward along the course of the veins, and is aggravated by maintaining the limb in a dependent position.

Varicose veins are to be treated according to the rules laid down in the chapter devoted to that subject. The complications are of a serious import, and nothing short of the destruction of the vessels by their ligation, or by some powerful escharotic, as the Vienna paste, will prove beneficial. When the malady is slight, amelioration may be had by wearing a lace stocking, for the purpose of supporting the limb, or by the use of cooling or stimulating lotions, with an occasional application of tincture of iodine (diluted) along the track of the distended vessels. Hemorrhage sometimes occurs in consequence of the ulceration opening contiguous veins. Cases have been seen where a quart of blood has been lost in a few minutes; and in two instances the bleeding was so profuse as to occasion the death of the person.

Treatment.—The treatment of varicose ulcer should be conducted on the general principles laid down for indolent ulcers, so far as the sore itself is concerned. The *primary* attention of the surgeon must be directed to the veins, which will receive especial consideration under the head of Varix—to which the reader is referred—in a subsequent chapter of this work.

CONSTITUTIONAL TREATMENT.

Obstinate ulcers, say Marcy and Hunt, are invariably the result of some dyscrasia of the organism, which should become the special object of attention. Even simple ulcers should be healed slowly; and, under the use of proper internal remedies, this can always be done.

The internal remedies that are most eminently useful in controlling the disposition to these ulcers, and in assisting the process of cure when established, are in reality the most important part of the treatment. The totality of the symptoms in each case and the pathogenesis of the different remedies must be closely studied in reference to their adaptability to the disease in question. The remedies in which the greatest confidence can be reposed are, for the

Simple Ulcer—Arsenicum, asafoetida, carbo vegetabilis, lachesis, lycopodium, mercurius, pulsatilla, sepia, silicia, and sulphur;

Irritable Ulcer—Arsenicum, belladonna, bryonia, calcarea carb., calcarea phosph., hepar sulph., graphites, mercurius, mezereum, phosphoric acid, kali hydriod., silicia, sulphur, and thuya;

Indolent Ulcer—Acid phosph., carbo vegetabilis, euphorbium, sanguinaria, sepia, mercurius rub. ox., arsenicum, acid muriatic, creosote, chamomilla, and ranunculus bulb;

Varicose Ulcer—Arsenicum, fluoric acid, creosote, phosphoric and muriatic acids, silicia, and sulphur.

The following remedies and their indications will be of assistance in determining the appropriate medicine in each case:

Asafoetida.—Ulcers with elevated, bluish edges, discharging a thin, ichorous, and fetid pus, acutely sensitive and painful on being touched—especially in those which affect the bony structure; and also in venereal and mercurial sores.

Arsenicum.—In ulcers which bleed easily, are very painful and of a *severe burning* character, alternating with sharp, tearing pains; the edges are hard, irregular and everted, with a disposition to coldness in the part; the discharge from which is thin, scanty, offensive, and bloody, or dark-colored, copious, fetid, and ichorous; in old ulcers, with red, shining areola, and a black or blue base, having a lardaceous appearance, with patches of *proud flesh*; in

malignant ulcers, secreting a thin, ichorous, offensive pus, with distressing burning, bleeding, and destruction of the soft parts; in phagedenic ulcers, also, which destroy soft and cartilaginous structures.

Belladonna.—When the areola around the ulcer is inflamed, red, and painful, with *burning*, and increased when touched; pains increased at night, with soreness or lameness of the affected part; bloody, ichorous discharges; in ulcers of a scrofulous or mercurial character, which bleed readily and are covered with a blackish crust; in *fungus medullaris* and *hæmatodes*, where the disease has not advanced too far; and especially when the optic nerve is attacked, if disorganization has not occurred.

Calendula.—This is one of the most valuable remedies in the materia medica for suppurating surfaces, ulcerations, etc., and may be advantageously used in every variety of ulcer, both as an external and internal remedy. Prof. Temple, of St. Louis, was the first physician to test the efficacy and curative powers of this drug in suppurating surfaces, since which time it has received the highest encomiums from a score or more of practitioners, all of whom unite in testifying their admiration of the exalted remedial virtues of this medicine. During my service in the "war of the rebellion," I used it very largely in suppurations, ulcerations, etc., and found it one of the most reliable and efficient remedies.

Hamamelis.—This remedy is highly extolled for its curative powers in ulcerated surfaces, by Dr. Adams, of Springfield, Ill., who has employed it with great success. He uses the preparation known as Pond's Extract of Hamamelis.

Carbo Vegetabilis is indicated in ulcers secreting a foul, ichorous pus, and emitting an offensive odor; as an external application, in neutralizing the foul odor, by sifting over its surface a little finely-powdered charcoal. It is useful in ulcers which have no inflammatory reaction, which are indolent, torpid, and *entirely destitute of organic reaction*. It may be advantageously alternated with arsenicum when gangrene threatens—the discharge being very fetid, and the burning pains exacerbating toward evening or at night.

*Capsicum** has been frequently used, internally and externally, for those obstinate ulcers where nothing else affords relief, such as

* Hill and Hunt's Homœopathic Surgery, p. 119.

those met with in ulcers on the legs of females who have been affected with *phlegmatia dolens*; the pain being of the severest character, and nearly continuous, *smarting and burning as though the part was enveloped with fire*; the nervous system much affected; chills and great prostration, loss of appetite and great thirst, being accompaniments. For the external application, dilute the tincture, leaving it strong enough to produce severe smarting, and wash the ulcer freely with it. Though it first aggravates the suffering of the patient, it will soon allay the burning and smarting. It may be reapplied upon a return of the pain, and will soon change it to a healthy ulcer.

Graphites is beneficial when the pain is of the itching and smarting kind, with a feeling of pressure and sticking; the pain being very violent, with a sensation as though the bone would be broken if the limb is moved.

Hepar Sulphuris.—In ulcers with itching, corrosive, gnawing pain, burning and throbbing at night; *bleeds even when slightly wiped*; the discharge having a *sour smell*, as of old cheese. It may be alternated with arsenicum, or given after arsenicum has been used.

Lachesis.—In indolent ulcers attacking scorbutic or scrofulous constitutions, or when occurring after large and poisonous doses of mercury; fungous ulcers, deep, varicose, bluish, indented, or discolored with red areolæ; ulcers which bleed or become gangrenous, spread, and are surrounded by pustules; foul, flat ulcers, with ichorous discharge; old, very painful ulcers, deep, foul, and uneven at the bottom, having a spongy appearance, burning pain at night, with numerous small ulcerating pustules around the ulcer.

Mercurius.—In deep ulcers, disposed to spread rapidly, bleed easily; very sensitive, the least touch causing severe pain; bare, uneven, and of a dirty reddish or lard-like appearance; edges raised, irregular, serrated, varying in appearance; some portions red and shining, and others livid; pus thin and offensive; pains burning, with stitching and shooting pains. If, in addition to these, there should be present quick pulse, restlessness, profuse night-sweats, great nervousness and impatience from slight causes, the indications will be more strongly marked.

Pulsatilla.—In flat, putrid, erosive, *varicose*, and easily-bleeding ulcers, surrounded by a dense, shining-red areola, with

severe itching; pain in the ulcer, of a biting, burning, stinging character, relieved by pressure.

Cantharides.—In redness, inflammation, and gangrene of the surface; excessive debility, languor, and emaciation; exudation of a serous liquid from a vesicated surface; itching and lacerating ulcers of the leg. A gentleman who had suffered for sixteen years with chronic ulcer on the calf of the leg, with watery blisters exuding large quantities of serum, was cured entirely by the use of this drug.

Silicia.—In old, indolent ulcers, in persons whose constitutions have become weak, debilitated, and cachectic, from various causes. It is indicated in irritable ulcers when granulations spring up in the bottom; or in those with rough, hardened edges, like cartilage, and where the surrounding parts are swollen, red, and hard, with sticking and burning pain around the margin; aching pain in the ulcer; pus thick and discolored, or thin, bloody, ichorous, and offensive. It may be beneficially alternated with sulphur, sepia, or nitric acid, in obstinate cases, according to the indications of these remedies.

Solanum.*—All varieties of this plant are good remedies in ulcerations, whether of the simple or malignant type. It is one of the best local remedies in ulcerations.

Sulphur.—Every form of indolent ulcer in psoric constitutions; also in all old sores, whether scrofulous or mercurial, and where there is a tendency to the production of fungous growth, and no distinct appearance of granulations; in ulcers occurring in persons having asthma, urticaria, herpes, or scrofula; fistulous, carious, canceroid degenerations; fungous or irritable ulcers, with indented edges or red areolæ; those which bleed easily, with swollen and sensitive edges, discharging a thin, ichorous, fetid, or sanious fluid; ulcers which turn black, suppurate, and become putrid, without pain, or with boring and throbbing pains; in indolent ulcers, having a dark-bluish areola, with spongy, insensible granulations, and a smooth, shining surface, discharging a thick, yellow pus. For phagedenic and varicose ulcers, Hartmann recommends the first attenuation morning and evening. He says it will remove the itching and burning, and the inflammation around the ulcer, in a few days; though to cure them will occupy a number

* Marey and Hunt, vol. ii, p. 387.

of weeks. It acts specifically upon the venous circulation, and is indispensable in the treatment of varicose ulcers in scrofulous systems, and exerts its curative action by removing the torpor of the vessels and restoring the irritability of the capillary system.

SECTION VI.

PATHOLOGY OF MORTIFICATION.

Mortification is the general term which includes the whole process of death in a part, from its beginning to its termination. It is further subdivided into *gangrene* and *sphacelus*; the former denoting the process of dying—the latter the result of the process, or actual death of the part. These terms are frequently used indiscriminately, but improperly so. Another distinction is also made between *humid* and *dry* gangrene. The *humid* is a consequence of inflammation, or of obstacle to the return of venous blood; and the mortified part, being loaded with fluid effusion, soon undergoes decomposition; while the *dry* gangrene is generally a consequence of deficient supply of blood, or of constitutional causes, and is either preceded by no inflammation at all, or by one so rapid that there is no time for interstitial effusion to occur; so that the mortified part becomes dry and hard—in the former case being called a *slough*, in the latter an *eschar*. When *gangrene* is about to commence, as a result of inflammation, the signs of this affection become modified. The redness passes into a dark and livid hue; for circulation has ceased, and the blood is becoming decomposed. Circulation having been arrested, so is exudation, and the swelling is less tense. On the surface, however, effusion of serum may take place, and that profusely. All vital action decaying, pain and heat remarkably abate, and often suddenly cease. Sensation gradually leaves the part. Just before, even a moderate degree of pressure aggravated the pain; now, even rude handling is borne with impunity. Nutrition, the source of animal heat, having ceased, temperature necessarily decreases, and usually with rapidity; rapid putrescence takes place, and, as the result of chemical change, an offensive odor is more or less freely exhaled. The surface is usually studded with *phlyctænæ*—that is, elevations of the scarf skin by putrid serum—which are easily distinguished

from the dark vesicles filled with bloody serum that often attend simple bruises. In the former case, the epidermis is detached from the cutis not only at the elevated spot, but all around, and consequently the phlyctænæ may be changed from one point to another by pressure. Another mark of distinction is, the phlyctæna is not attended with heat, pain, and swelling, as in the case of the vesicle, but is associated with all the other symptoms of advancing gangrene. When inflammation is about to terminate in mortification, its redness gradually assumes a darker hue, and becomes purple or blue; the heat, sensibility, and pain diminish, but the swelling often increases in consequence of the continued effusion of sanguinolent serum, producing the *phlyctæna* before alluded to. If the *gangrene* advance to *sphacelus*, the part assumes a dirty brown or even black appearance; the structure becomes soft, flaccid, and cold, crepitating when pressed, and emits a cadaverous odor from the gases that are evolved by incipient putrefaction. While gangrene is spreading, the dark color is diffused and insensibly lost in the surrounding skin; but when its progress is arrested, a healthy circulation is re-established up to the very margin of the sphacelated portion, and a bright-red diffused line of adhesive inflammation (called the line of demarkation) separates the living from the dead parts. This line is very important in our prognosis, and tells us the mischief is stayed, and there is a disposition in the vital forces to repair its ravages. After the death of a part—as, for instance, a portion of skin, areolar tissue, artery, or bone—the part sphacelated is called a *slough*, and the process of death, *sloughing*.

Sphacelus being complete and gangrene limited in extent, nature attempts to throw off the diseased mass, the presence of which acts as a constant source of irritation. Recovery being impossible, the dead part in contact with the living tissues is productive of injurious results; the noxious effects of putrescence are absorbed into the living structures, and the poisonous principle is manifest by increased constitutional disorder attendant on the gangrene. The living part, in immediate contact with the dead, inflames, and the *line of separation* is established, as follows: At first the portion vesicates, which vesicle soon bursts, emitting puriform matter, and terminating in an inflamed and ulcerated surface. The furrow thus made deepens gradually, first destroying the soft parts, and finally extending to the denser structures beneath. This destruc-

is effected in a sloping direction, as shown by the accompanying plate, Fig. 136, until nothing but the bone remains undivided. No hemorrhage occurs during this process. The inflammation has been slow in its progress; *exudation* and *organization* of fibrin, preceding suppuration and ulceration, seals up the open vessels and protects them from the ravages of purulent infiltration. The stump, by this process, is too *conical*, and illy-adapted for useful purposes. It is on this account that the surgeon is called upon to interfere and remedy the deformity, which is effected by amputation above *nature's line*.

Fig. 136.



Complete sphacelus of foot and ankle. Detachment all but complete. The sloping line of separation well shown; studded with granulations.

When gangrene does not involve the whole thickness of a limb, the process of separation is still the same; the parts yielding under the process of suppuration and ulceration until the dead portion is fairly separated from the living.

CONSTITUTIONAL SYMPTOMS OF MORTIFICATION.

The constitutional symptoms of mortification vary greatly. During the early period of inflammation, they assume the characteristics of a high grade of fever; but so soon as gangrene sets in, if it be of rapid occurrence, the constitutional disturbance is always accompanied by an *asthenic* type of inflammation, attended by great depression of the powers of the system, with a dull and anxious countenance, and a feeble, quick, and easily-compressible pulse; the tongue is brown, and soon becomes loaded with sordes. Mr. Travers has beautifully described this disorder in the following language: "The pulse is increased in frequency and diminished in diameter and force, in many cases irregular, and in some intermittent; a peculiar anxiety of expression appears in the physiognomy, and a remarkable livor overspreads the face, the features of which (the nose and lips especially) are contracted and pinched. The anxiety is soon exchanged for a hebetude of

expression, as if the patient was under the influence of alcohol or opium; involuntary movements and tremors affect the hands and fingers; and frequent sighings are observed, which are broken by occasional hiccough. The inclination for food fails totally; the surface of the tongue is coated with a brown fur, harsh and dry, leaving the edges and tip free, but without moisture. As the case advances, the entire tongue, fauces, and lips become dry to incrustation, so as to require constant moistening, but with small quantities of fluid, for swallowing is slow and attended with difficulty. The skin, which in the onset was dry, opens to a copious but clammy perspiration over the whole surface; it parts sensibly with its temperature, and feels cold as well as damp. The mind—at first irritable, then, after the total subsidence of pain, stupid—wavers, and becomes subject to illusions, chiefly of a passive and transient kind, expressed by half-sentences, with a thick and broken articulation, and accompanied with startings and momentary gleams of insane excitement. In traumatic gangrene—the age and constitution being previously in full vigor—this low delirium is exchanged for fits of active and wild frenzy, accompanied with loud cries and vehement efforts, requiring a powerful and continual restraint; and this continues, with occasional intervals from exhaustion, for hours together, and subsides, often suddenly, in prolonged coma and apoplectic death.” When it is *internal*, a sudden cessation of pain, with hiccough, vomiting, and tympanitic distention of the abdomen, may be superadded to the symptoms, and indicate the progressive malady. When the invasion of mortification is more gradual, as we see in some of the constitutional forms affecting the lower extremities, the symptoms are usually those of irritative fever, eventually subsiding into the asthenic form. It is important for the surgeon to bear in mind, in the management of acute internal inflammations, as in the case of strangulated hernia, that the combination of hiccough and marked prostration, with sudden cessation of pain, plainly indicates that gangrene has occurred in the part inflamed, and that he is to frame his prognosis accordingly. Mortification is also divided into *acute* and *chronic*—acute having especial reference to the *humid* variety, and chronic to the *dry*. The former is also termed the *traumatic* and the latter the *idiopathic* form.

CAUSES OF MORTIFICATION.

The causes of mortification are infinite in number, and vary in their nature accordingly. At present, our object is to study this process as a consequence of inflammation, though this is far from being its only cause. Any condition of the arteries by which they may be prevented from keeping up a proper supply of blood to the part, may produce mortification, as for example: a ligature, when the collateral circulation is not sufficient to support life in the part; a bandage drawn too tightly around a limb; or any change in the vessels themselves, or in the blood, precluding a proper supply. Each of these causes may lead to mortification. In that condition in which we are likely to find the arteries of old persons, inaply known as ossification, the scales of calcareous matter may obstruct the vessels to such a degree as to bring about mortification. It may sometimes happen that coagula forms in the vessels, producing the same result; on the other hand, from weakness of their coats, vessels may become so greatly *dilated* as to impair the circulation to such an extent as to bring on gangrene of the parts they supply. Mortification may also be produced by pressure on the capillary system, an example of which may be seen in the occurrence of bed-sores.

In observing attentively the relations existing between the nerves, and blood-vessels, we find a harmony of action—the integrity of the circulation depending upon the integrity of the nervous action, to a great extent, and *vice versa*. In the consideration of mortification, then, we must also turn our attention to the impairments of *innervation*. Thus, for example, in a paralyzed limb, we sometimes find that mortification comes on, depending upon a weakness of the vessels, which is caused by an absence of proper nervous vitality, producing thereby a derangement of the circulation. Besides these causes of mortification, we also find a variety of *substances* which act in an injurious manner upon the living organism. For instance, if an animal is fed for a considerable length of time on *secale cornutum* (the fungous growth that appears on rye in certain seasons and localities), mortification of the extremities is almost sure to occur. The same effect has been produced upon the human family, in consequence of persons feeding upon bread in the flour of which this fungous growth had

been ground. A peculiar convulsive effect has been brought about, terminating in gangrenous sores and mortification of the extremities—a state of the system known as *ergotism*, and resulting frequently in death.

During the prevalence of plagues and epidemics, from apparently slight causes parts have been attacked by mortification; the system appearing to have been so much weakened and depressed by the morbid agent as to be unable to bear up even against slight injuries. Such cases have been known to occur during the epidemics of *yellow fever* that have raged with such violence in our southern cities. The bites of serpents and the stings of insects, when introduced into the structure of an organ, have been known to produce the same effect. Cold, also, though in its primary action it imparts tone and vigor to the system, if carried to extremes may produce mortification. But probably the most common causes inducing this disease are the exciting, such as gunshot wounds, the infiltration of urine or other stimulating fluids into the cellular tissue; the application of blisters or irritants to constitutions weakened by disease; long-continued pressure, as the sloughing of the skin over the sacrum or trochanters from long confinement in the horizontal posture. But of all these, the most common is *cold*. The immediate effect of cold,* intense and long applied, tends both to depress and weaken the circulation and nervous energy, and may be carried so far as to annihilate vital power. The parts most liable to become affected are those most remote from the center of circulation, as the toes and feet, the tips of the nose and ears.

OPERATIVE INTERFERENCE.

In regard to the question of amputation, surgeons are not altogether agreed. The rule formerly held was to wait until the gangrene was arrested and a line of demarkation formed, fearing that the malady might attack the stump. If the mortification arises from any *constitutional* cause, such as that produced by arteritis, loss of blood, and fever, I would advise a prudent delay; for in two instances of which I had personal cognizance both patients died from consecutive hemorrhage after amputation. But even after the

* Miller's Principles of Surgery, p. 243 and following.

line of demarkation has formed, it is necessary that attention should be paid to the constitution and strength of the patient—to see that there exists vigor enough to bear the loss of blood which must of necessity take place. Sir A. Cooper mentions an interesting case in which a mortified leg was separating favorably by itself through the calf, when the projecting bones were sawed off with a view of expediting the process. A few granulations were accidentally wounded, and the trivial hemorrhage that ensued was fatal. But if the cause of the mortification be local—as, for instance, in mortification of a limb from severe compound fracture, or from injury or aneurism of the large arterial trunks—it will then be good practice *to amputate without waiting for the line of separation*. This practice is sanctioned by high authority, and indorsed by such names as LARREY, S. COOPER, GUTHRIE, BRODIE, LAWRENCE, JAMES, and PORTER, of Dublin. Amputation is justifiable as a last resort only when there appears no disposition to limit gangrene, and whenever it spreads rapidly. Where gangrene, says Mr. Guthrie, is rapidly extending toward the trunk of the body, without any hope of its cessation, the operation is to be tried; for it has certainly succeeded where death in a few hours would have ensued.

Senile Gangrene.—There is a peculiar form of gangrene which appears in persons of advanced years, called *senile gangrene*, which commences by a purple or black spot on the inner side or extremity of one of the smaller toes; from which spot the cuticle, says Pott, is always found to be detached, and the skin under it to be of a dark-red color. In some few instances there is little or no pain, but in far the majority of cases the patients feel uneasiness through the whole foot or ankle-joint, particularly in the night, even before these parts show any mark of distemper, or before there is any other than a small discolored spot at the end of one of the little toes. Its progress in some cases is slow, in others rapidly painful. After its first appearance, the actual gangrene will generally be preceded by a dark-red congestive inflammation. The dead parts become shrunken, dry, and hard; and when the disease makes a temporary pause—which it frequently does—they slowly slough away, but a fresh accession of gangrene supervenes before any progress is made toward cicatrization. In this way the patient may live several winters, but generally sinks exhausted before the whole of the foot is destroyed.

Pathology.—This disease is mostly confined to old persons of the better class, especially if they have been what is termed free-livers, and is caused by ossification of the arteries, producing deficient circulation. The part, therefore, being imperfectly nourished, becomes weak and liable to pain and numbness; if heated after being cold, or a chilblain or any other trifling cause occurs, it is most sure to terminate in gangrene.

The *cause* of senile mortification was not, until recently, at all understood. Mr. Cowper, the anatomist, had indeed advocated the theory, which soon became general, that it was owing to the ossification of the arteries. Ossification of the arteries is merely, says Gross, a predisposing and not the immediate cause of the lesion, which consists in the formation of fibrinous clots, closing up the caliber of the arteries, and thus mechanically intercepting the passage of the blood. It has been ascertained that this mechanical obstruction occasionally exists at a considerable distance from the seat of the disease.

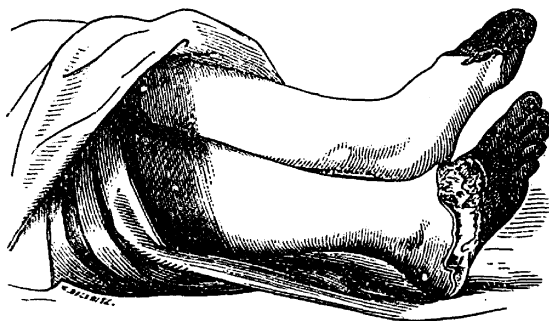
What the immediate cause of these clot formations is, has not been determined. It has been alleged that it is owing to the interception of the fibrin of the blood by the roughened walls of the arteries, consequent upon their calcification. Other authorities claim that it is due to an effusion of plastic matter, the result of chronic inflammation of the serous membrane, thereby favoring adhesion of the blood and its conversion into clots.

LOCAL TREATMENT.

Local as well as general applications are serviceable in the treatment of gangrene. "Stimulating lotions have been advised; but while inflammation of the part continues, they possess doubtful if not injurious tendencies. Stimulating applications, acting on the surrounding living parts, when sphacelus is complete, are likely to aggravate the disease and increase it to an injurious extent. As to their effect on the dead parts themselves, they are either nugatory or the reverse of beneficial. Scarifications were at one time the ruling practice. If they merely implicated the dead parts, they were inefficient; if they penetrated the living, they obviously did harm." During the formation and separation of sloughs, light poultices or simple warm-water dressings are preferable, as they are *soothing, grateful, and protective* to the surrounding living

tissues. Often the latter may be advantageously medicated with the appropriate remedy given internally, as advocated and recommended under the local treatment of ulcers. Antiseptic lotions, such as poultices of charcoal, chloride of soda or lime, etc., may be beneficially applied as correctives of fetor. As sloughs become detached by the undermining process of ulceration, they should be removed; and in assisting nature in these efforts, caution should be exercised not to produce any pain or occasion the loss of a single drop of blood. In chronic gangrene, a weak solution of nitrate of silver may be advantageously employed; but it must be applied with a great deal of care. It has been used quite extensively by some surgeons, applied to the sound parts so as to cause vesication, inflammation, and ulceration—to institute, as it were, a fictitious line of demarkation; and thus attempting to dictate to nature the point of arrest. This proceeding is fraught with a good deal of pain and unnecessary suffering, and has disappointed the expectation of those who have applied it for that purpose. A practice strongly recommended by Sir B. Brodie in this disease is to wrap the feet or other parts affected in *carded wool*. There have been several cases mentioned, successfully treated by this appliance. It doubtless has the good effect of preserving the proper warmth of the part, while the medicines internally administered are effecting the removal of the cause and restoring the parts to a healthful action.

Fig. 137.



Chronic gangrene of the feet, after exposure to cold. Separation considerably advanced.

Great discrimination will be required in the use of all external preparations in this disease. When the inflammation is very great, escharotics will be obviously improper. *Mild, soothing* lotions;

emollient poultices — grated potatoes or carrots; or the fermenting poultice — a mixture of bakers' yeast, molasses or sugar, peruvian bark or charcoal, to which may be added a small quantity of hop-beer — are exceedingly efficacious. The external remedies resorted to by the allopathic school, such as blisters, punctures, incisions, and the actual cautery, are prone to increase the mortification, and thus extend the mischief. When all means of treatment fail, amputation is the last resort. But in determining this it should be borne in mind that considerable difference exists between *traumatic* and *idiopathic* mortification. In the former, in urgent cases, it was considered good surgery to amputate while the diseased action was in a state of progression; in the *latter*, all authority is opposed to an operation until its progress is arrested and a distinct line of demarkation has formed. The disease sometimes appears at a very early age. Dr. Leonard, of New Albany, relates a case of a little girl only six years old, who, while apparently enjoying good health, was suddenly seized with excessive prostration, accompanied with delirium, unconsciousness, and great depression of the temperature of the whole body! In a short time the left lower extremity became livid, and by next morning the foot was discovered to be dead as high up as the ankle, the surface being black, dry, cold, and insensible. Amputation was performed after the *line of demarkation* appeared, which resulted in recovery. Few patients recover, remarks Gross, from this form of mortification. If occasionally one escapes, it only forms an exception to the rule — the disease in most cases proceeding steadily on, with an occasional temporary interruption, to a fatal termination. Fortunately, however, by the aid of homœopathic therapeutics, much has been already done toward alleviating the sufferings of this dreaded disease, and many instances of complete recovery have been reported that were hopelessly abandoned by the practitioners of the allopathic school.

CONSTITUTIONAL TREATMENT.

Attention should *first* be directed toward correcting the general febrile and dyscrasial condition; and *secondly*, to arresting the progress of the local affection. The local disease can not be arrested, generally, until the inflammatory action has subsided. A few instances are on record where the local mischief subsided, upon

the gradual disappearance of the fever, with little or no treatment directed to the pathological condition of the disease. A case is reported in Indiana, where a child, after the sphacelation had produced a large aperture in the cheek, seemed to be cured by the application of sweet cream to the raw surface from which the mortified part had separated. Healthy granulations immediately commenced, and the destroyed structure was restored, leaving very little deformity.*

Aconite, in the formative stage, and where there exists much constitutional disturbance, is one of the first remedies to be advantageously employed. As in febrile affections generally, its indications point to it as a leading remedy, either alone or in alternation with the specifically indicated medicine.

Gelseminum is a drug highly extolled by some practitioners, in the formative stage of the disease, in lieu of aconite; but I consider the latter remedy, under ordinary circumstances, entirely preferable during the stage of inflammatory excitement.

Arsenicum is exceedingly useful as a specific remedy for mortification, as it has many symptoms that belong to that disease; and especially is it beneficial in subjects living in marshy, malarious climates. It corresponds with many of the constitutional symptoms and not a few of the local manifestations, viz: Numbness, stiffness, and insensibility of the feet, with swelling and pain; coldness of the feet, with contracted pulse; swelling of the feet, with hot, shining, and burning red spots and bluish blisters; hard, red, blue, painful swelling; colorless swelling of the malleoli, with tearing pains, relieved by external warmth; the skin of the soles of the feet is insensible, thick, and covered with rhagades; ulcerated and spreading blisters on the tips of the feet; discoloration of the nails, with black blisters, attended with burning pain. In *gangrena oris*, arsenic is an important curative agent. It possesses a relation to that disease in the following corresponding symptoms: Blisters on the tongue — its membrane thickened, with aphthæ and superficial ulcers on the edge; bloody saliva; heat and pain in the fauces; throat and uvula swollen and red; erysipelatous redness and swelling of the face.

Cases are related as having been cured by "Fowler's solution"

* Marcy and Hunt — Practice of Medicine, p. 356.

(in which arsenic enters as the important ingredient, in the form of arseniate of potassa), after the sloughing had destroyed one-fourth of the lower lip, with profuse salivation. The accompanying fever had been reduced by other remedies, and local expedients applied to the diseased surface. One case is reported cured treated by local application of diluted muriatic acid and camphorated alcoholic fomentations. In the absence of fever, arsenic (in Fowler's solution) was given to such an excess as to produce burning distress in the stomach, when the sloughing ceased and granulations formed under the use of medicated lotions. The termination of the case was successful, with little deformity.

Lachesis.—This drug is *par excellence* the most important in the treatment of mortification. It is *en rapport* with that condition of disease, as is shown by the following symptoms: Gangrenous blisters; bluish or black-looking blisters; vesicles appearing here and there, and increasing in size, with violent itching and burning, as if the flesh would be torn from the bones; swelling and inflammation of the part, with violent pains, dry mouth, constant fever, dry skin, and constant thirst; the light brown areola becomes bluish-black; tingling in the part, with heat and numbness; the skin cracked, and deep rhagades; bluish-red appearance of the part, with swelling; coldness of the part, as if ice was in contact with it; itching pain and painful spots appearing after rubbing, with dark blue borders and dry scurfs.

The following cases of gangrene are reported as having been cured by the remedy:

CASE 1. Gangrene after injury.—A boy aged nine or ten years had a severe injury from the explosion of a pistol held in the clenched hand, which was much lacerated. The little finger, with its metacarpal bone, was left hanging at the wrist by a shred of muscle, skin, and tendon; soft part in palm of the hand loosened from the bones; parts were dressed with arnica and water; inflammation followed, and union by the first intention took place in a portion of the wound; the remaining surface was covered with granulations. At the junction of the finger with the hand, on the lower part of the palm, there was a spot nearly the size of a twenty-five cent piece puffed up, of an ash-gray color, emitting an exceedingly offensive odor; gangrene had commenced. One dose of lachesis, 6°, arrested the progress in a few hours. The dead

portion sloughed off shortly after, and the healing process went *uninterruptedly to a favorable termination*.*

CASE 2.—A young man whose tibia and fibula were crushed under a large grindstone, ankle-joint contused and lacerated, had the wounds dressed with arnica externally and internally. On the seventh day gangrene commenced, with bluish-purple vesicles for some distance round the wound, covering a dirty ash-gray ground, with offensive odor. Amputation was now the only resource of surgery, according to allopathic authority. Lachesis, 6°, was tried with the most happy results. In six hours the nature of the case was entirely changed; in twenty-four hours the blisters had disappeared, swelling gone down; two days later the dead portion had sloughed off—the wounds granulated favorably, and the foot was saved.

CASE 3.—In this instance gangrene supervened on a scalded limb. A boy aged seventeen fell with one leg into a kettle of boiling soap, destroying the skin and adipose covering of the limb. The ninth day the dead portions, so far as they were loose, came away, exposing the fascia in places; discharge of pus profuse; muscles irritable, and jerking spasmodically. On the twelfth day suspicious points on the exposed fascia emitted intolerable stench; fascia puffed up, presenting purplish-brown appearance, and discharging bloody sanies—showing gangrene had commenced. It was arrested by one dose of lachesis, 6°. Three days later the fascia sloughed away, leaving healthy ulcers, which soon healed. Some other parts presented appearance of gangrene, and were corrected by lachesis. The cure was complete, though with permanent flexion of the thigh.

I have used this remedy in a number of cases of gangrene following wounds, and have never been disappointed in its results. In a case of compound complicated fracture, terminating in gangrene and threatening speedy destruction of the limb, the gangrene was quickly checked by the *internal* and *external* use of lachesis—the inflammation subsiding, and the healing process moving on to a complete cure. In another case of compound dislocation of the ankle-joint, with fracture of malleolus externus (occurring in this city), followed by gangrene, lachesis effected a speedy cure—the patient making a good recovery under the surgical treatment

* U. S. Journal of Homœopathy, vol. i, p. 60.

employed. I can not recommend too highly the use of this agent for gangrene, and am confident the observations of all who have or may employ it will bear me out in the assertion that it is eminently curative of gangrenous affections.

Crotalus is a remedy of efficiency in this disease, and corresponds with the following symptoms: Swelling and coldness of the feet; numbness and burning of the toes; heat and intolerable gnawing of the feet; livid spots, with swelling of the parts, cold and painful on pressure; insensibility of the swollen part; gangrene over the whole body. The spot where the bite was inflicted is black, with dark-red circle, the inflammation extending to the surrounding structures; soon after it becomes gangrenous, and is separated from the muscles by a fetid fluid.

Secale Cornutum.—This is another important remedy, and possesses undoubted curative powers, especially in the treatment of *dry gangrene*. “A very remarkable form of chronic gangrene,” says Gross,* “is sometimes produced by the inordinate use of *ergot*, or *spurred rye*, the *secale cornutum* of botanists. The affection, which has occasionally prevailed endemically, has hitherto been observed chiefly among the inhabitants of France, Germany, and Switzerland, in certain districts of which rye-bread forms a principal article of diet. When the seasons are very wet, an unusual quantity of ergot is generated, and this, entering largely into the composition of the flour, has the effect, when used for any length of time, of giving rise to mortification in the remote parts of the body. The attention of the profession was first directed to the subject in a prominent manner in 1676, by Mons. Dodard, a French physician; and since then it has been frequently noticed by other writers. For a long time doubts were entertained respecting the power of ergot to produce this effect; and in order to solve these, Mons. Tessier, of Paris, was commissioned many years ago by the Royal Academy of Medicine to investigate the matter experimentally. For this purpose he selected various animals, especially pigs, ducks, and turkeys, which he fed exclusively upon ergot. He found that most of them died between the tenth and twenty-fourth days, and that distinct marks of mortification existed in the bodies of all, both externally and internally.

* Gross's Surgery—subject, Mortification, p. 203.

I am myself inclined to believe that the primary impression of the poison is upon the blood, rendering it abnormally stimulant and plastic; and secondarily upon the inner coats of the arteries, which, becoming inflamed, thereby intercept the liquid, and thus lead to the formation of fibrinous clots. In a word, there is reason to believe that mechanical obstruction of the vessels is the direct and immediate cause of the gangrene; and if this idea be correct, we can not fail to discover *the closest analogy between this form of the disease and senile mortification*. It has been observed at all periods of life, and is usually preceded by discoloration, pain, and burning heat, which, subsiding in the course of four or five days, leave the parts *cold, dry, hard, insensible, of a uniform black color, and free from fetor*. It generally begins in the *toes*, whence it gradually extends over the *foot and leg*, until, in some cases, it reaches as high up as the hip. Occasionally it appears simultaneously both in the *lower and upper extremities*, as well as in the *nose and ears*."

The foregoing description gives as ample evidence of the homœopathicity of this drug for dry gangrene as the most elaborate resume taken from our *materia medicas*.

Mercurius is indicated in *all cases* of *gangrenopsis*, or gangrene of the *lips, tongue, and cheeks*, in which it is certain that that drug has not been administered previously in quantities sufficient to produce its poisonous effects upon the system. In those cases where it is impossible to arrive at correct conclusions touching this matter, or where any doubt may exist in the mind of the practitioner, it is always the more prudent course to begin with the *higher* attenuations, and watch its characteristic effects as they manifest themselves from time to time during the action of the remedy.

Chlorate of Potash.—This drug possesses properties analogous to mercury, "displaying a well-known elective action on the glands and mucous membranes of the mouth." On this account it is one of the most efficient remedies we have to counteract the poisonous effects of mercury. In cases where mercury has been employed in massive doses, producing salivation and the attendant evils that follow in its train, the chlorate has been used to arrest it. Practitioners of the allopathic school, in administering mercury to obtain its extreme effects, frequently employ the chlorate to check the formidable mercurial disease, and permit the mercury at the same time

to be continued without danger. The chlorate, for this purpose, is used in solution; the inflamed or ulcerated surfaces being frequently bathed with the remedy, small portions of it being permitted to pass into the stomach. At the Hospital St. Eugenie it has been employed quite extensively for ulcero-membranous stomatitis. as it is said, with the most brilliant success.* Dr. Dethau proposed "to employ it in the form of pastiles, so that the patient may have at hand a remedy against the injurious effects of a mercurial course." Ricord and Fournier, say Marcy and Hunt, have found the remedy successful in this form. In gangrene of the mouth from mercury, and in some other diseases connected with malarial and epidemic fevers, it is considered the most efficacious remedy hitherto employed. Mr. Frazee, of England, recommends it in canceroid diseases and ill-conditioned ulcers. As a deodorizing agent, it is one of the best known; and this fact indicates its appropriate application in other gangrenous conditions, as well as in gangrena oris. A weak solution, dispersed by damp towels in different parts of the room, is sufficient to remove the most offensive odor. For this purpose it has been largely used as a disinfectant, with the best results. *Pernanganate of potash* has ascribed to it similar properties, and may be employed in the same manner.

Iodide of Potassium.—The effects of this drug are similar to those of the chlorate; it is considered a specific for the poisonous effects of mercury, and is more largely used by practitioners than the preceding remedy. It corresponds, say Marcy and Hunt, "to scrofulous constitutions subject to rheumatism, who have been injured by mercurial and other debilitating remedies; chilliness followed by general fever; dryness of the mouth followed by salivation; profuse serous discharge from the nose; inflammation of the mucous membrane of the nose and eyelids; eyelids œdematous; catarrhal inflammation of the schniderian membrane, extending to the frontal sinuses; ulceration of the tongue and mouth, without salivation—otherwise ptyalism, with great swelling of the tongue; excessive ulceration of the mucous membrane of the mouth; bloody saliva."

There are a variety of remedies recommended for the treatment of mortification besides those mentioned; but I am satisfied that

* L'Union Medicale, 1857.

in all curable cases these medicines will be amply sufficient to meet all the indications, so far as constitutional specific treatment is concerned.

Accessory Remedies.—*Belladonna* is an important medicament when constitutional derangements occur, such as burning heat and unquenchable thirst; and especially if there exist the characteristic trembling of the extremities, clouds and spots before the eyes, with dilated pupils, etc. It may be associated with the specifically-indicated remedy, and continued until the subsidence of the symptoms which pointed out its use.

China.—In cases where there have been profuse or frequently-repeated hemorrhages, which have left the patient weak and debilitated; or where there exists coldness in the extremities, or of the whole body, with pale and clammy face, the parts around the wound becoming soft, blue, and swollen; or with chills alternating with heat.

Carbo Veg. is more especially indicated in *gangrena senilis*, but is serviceable in some cases of *humid gangrene*.

Hyoscyamus may be administered when, in connection with the gangrene, there exist hiccough, vomiting, or an inability to swallow.

Rhus tox.—In those cases where great prostration exists, with a tendency to typhoid fever, or when the fever has become fairly developed.

Euphorbium is said to produce good effects in the gangrene of old persons.

Lauro-cerasus is recommended highly for gangrene of the penis, to be applied externally and internally.

*Phosphoric acid** is said to have cured *senile gangrene* when all other remedies had failed. It acts as a specific neutralizer in cases of mercurial poison. †The American surgeons in the Russian service at Simpheropol and other hospitals in the Crimea, at the time of the siege of Sebastopol, found creosote to be the most useful application to the gangrenous surface. It is less painful than nitric acid; and in a very large number of cases in their hands it proved entirely successful.

Bromine was used quite extensively in gangrene following gun-

* See Hemple's *Materia Medica*, first edition, p. 861.

† American Jour. Med. Sciences, April, 1856, p. 570.

shot wounds, in the late rebellion, and is said to possess great efficacy in arresting mortification and assisting resolution of the diseased process. It was made the basis of a report to the Surgeon General by a committee appointed to investigate the pathology of this disease and its curative treatment. *Iodine* is also spoken of as possessing much curative value in this disease.

On the approach of an attack of gangrene, a blister of *emplas-tum cantharides* is frequently of great value in checking or entirely averting the morbid action. To be of benefit it should be large enough not only to cover the threatened part, but to extend over a portion of the healthy skin, and retained long enough to effect thorough *vesication*. It acts upon the principle of similia, and in the incipient stages of the disease there is no remedy more efficient as a topical expedient. It is of especial service in the idiopathic form, but produces excellent results in the traumatic variety of the disease.

When mortification has already *taken place*, our mode of treatment must be different from that in the incipency of the disease. If the patient is weak and debilitated, in connection with the specific constitutional means recourse must be had to generous diet, and even the use of wines and other stimulants. The diet should be as nourishing and concentrated as possible, so as to afford the greatest amount of sustenance in the smallest space, that it may not oppress by its bulk and weight. The articles most suitable are the different animal broths, jellies, sago, tapioca, arrow-root, and like farinaceous articles.

Whatever means of a general nature are adopted, the utmost attention must be paid to cleanliness and to the free circulation of air in the patient's apartment. The body should be sponged two or three times a day with tepid salt water, or, if there be much perspiration, with a solution of alcohol and water; care being taken not to *fatigue* the patient by these means. Both the body-linen and bed-clothes should be changed daily, and a pure state of the atmosphere should be insisted upon, as conducive to healthy reaction. The *fetid exhalations* from the surface should be corrected by the liberal use of the chlorides, or Labarraque's disinfecting fluid, sprinkled freely upon the parts, as well as upon the body and bed clothes. The *separation of the slough* should be encouraged by the continued application of fomenting cataplasms,

or warm, medicated, or simple water dressings. The ordinary yeast poultice, as described before, answers an admirable purpose. Where an additional excitement in the part is required, recourse may be had to the nitric or muriatic acid lotion, camphor water, solution of the chlorinate of soda, or the pyroligneous acid. Pieces of lint saturated with either of these preparations may be laid in the furrow, and retained there by the cataplasm.

When the sloughs are tardy in separating, advantage may be gained by using the scalpel to assist the process, particular care being taken not to interfere with the living tissues, or divide any important vessels, as patients, from want of this precaution, have been known to bleed to death; for when the powers of life are greatly reduced, an inconsiderable hemorrhage may prove fatal. After the dead parts have been removed, the next object is to promote granulation, which may be effected in the same way as advised under the head of Ulcerations.

The question of amputation in connection with this disease is a most important one, and is governed by attending circumstances and the nature of the mortification. If the gangrene be *idiopathic*, as before stated, the rule is never to amputate until the line of demarkation is *fully* established, and both the part and the system are in a fit condition to bear the shock of the operation. To amputate in an enfeebled and worn-out condition of the system—which may be known by the paleness of the face, weakness and fluttering of the pulse, and clammy state of the skin—will not only endanger the result, but may destroy the patient. It is better, under such circumstances, either to wait, and permit the part to be amputated by nature, or until sufficient time is gained to effect a favorable change in the system, and then to make the operation.

In *traumatic* gangrene, it is very different. The process of mortification goes on more *rapidly* and *extensively*; and to defer the use of the knife may jeopardize the life of the patient, and permit him to die without making a last effort to save him. Where injury of an important *nerve*, *artery*, or *joint*, is the cause of the mortification, amputation should be done promptly; else, by delay, the case may be placed beyond the aid of the surgeon's art. This is the treatment recommended by army surgeons in mortification following gunshot wounds of important parts, and is also applicable in civil practice in consequence of

the frightful injuries that frequently follow railroad, factory, and steamboat accidents, where the soft parts are completely pulped, and large joints and vessels are laid open and crushed into shapeless masses. Under these circumstances, the duty of the surgeon is to decide and act promptly; and if the patient is seen in time—that is, during *the shock*, and *while the system is in a state of anæsthesia from the accident*—I would recommend the operation to be made then and there, rather than wait for reaction, as generally recommended by surgical writers. After an extensive experience in the field of operative surgery, embracing these two processes, I am clearly of opinion that the former plan of operating (*during natural anæsthesia*) is entirely preferable, and productive of the most satisfactory results.

SECTION VII.

HOSPITAL GANGRENE.

This affection was formerly the scourge of both military and civil hospitals; and during the Napoleonic and Anglo-Russian wars, thousands of persons died from its destructive ravages. It seems to have been known and described by the older writers—Aetius, Páulus, and Avicenna—but was not brought before the profession prominently until during the continental wars, at the end of the last century and beginning of the present. Then, from the crowding of wounded men in hot, dirty, and confined apartments—perhaps after long and rough carriage, with bad food, mental depression, and insufficient attention to dressing and cleanliness—foul degeneration of sores became not uncommon; and hospital gangrene was manifested in all its virulence, as the graphic pages of Henner, McLeod, Blackadder, Boggie, and others, sufficiently testify. The symptoms which characterize the disease are very similar to those of a phagedenic ulcer ingrafted upon a simple ulcer or wound. When the affection is about to attack a wound or ulcer, the part becomes exceedingly painful and inflamed; at times the discharges become arrested, or at least diminished, and the surface is covered with gray spots of gangrene, which rapidly spread and deepen till a more or less extensive slough is formed. The skin around takes on an unhealthy, livid hue, and a stuffed,

swollen appearance. The edges of the sore are rigid and everted, and are apt to assume the form of a circle; the slough is pulpy and not easily removed, the process of its gradual separation from the subjacent tissue being accompanied with an unhealthy-looking and very offensive discharge. The pain, which persists through all this, is of an exceedingly acute and burning character; nor is the trouble over when the first slough is at last detached, for the same process is apt to be repeated, and a larger circle is made.

Recent wounds, and sores of a non-specific character, are said to be most liable to be attacked by this disease. No tissue can escape it, though the arterial structures appear to be able to resist the morbid action longer than any others. Those persons who have been under the influence of mercury appear to be peculiarly liable to it. As evidence of this, I will state that at the Mound City Hospital, under my charge during the rebellion, where comparatively minute quantities of mercury were used, and where over six thousand wounded were treated from the various battle-fields in 1861-62, only one case of hospital gangrene occurred, and that was in a wounded soldier who had been *salivated* in consequence of chronic diarrhœa.

The causes of these epidemics have been variously attributed—from *infected atmosphere*, through the means of *impure* and *fetid* dressings; from *crowded* and *ilky-ventilated* apartments; by direct *contagion*; or from some *atmospheric* or *epidemic* influence.

Diagnosis.—The diagnosis of hospital gangrene is generally not difficult, in consequence of the very limited number of diseases with which it can be confounded. The only affection that it really resembles, and for which it can be mistaken, is scurvy; but a little attention to the characteristics of the two diseases will serve to render the distinction between them very evident. The ulcer from scurvy is distinguished by its peculiar *livid*, *fungous*, *bloody*, and *fetid* character; the granulations are of *enormous size*, very *soft*, *spongy*, *rapid in growth*, and *bleeding freely* at the slightest touch; the discharge of blood is *copious*, lying in clots upon the surface of the ulcer, from which it is removed with great difficulty. The *pain* attending this condition of disease is trifling, and frequently entirely absent; the *granulations*, if cut away, are speedily reproduced, and frequently reappear in a single night.

Scorbutic ulcers are also always associated with a *fungous disease of the gums*, which are extremely vascular, and bleed easily when touched; *hemorrhagic spots* are seen in various regions of the body. As an important diagnostic difference: In scurvy there is an *entire absence of fever*—also of vesication. In hospital gangrene, on the contrary, there is always serious constitutional derangement, with excessive vascular action locally. The ulcer is foul, exquisitely painful, deeply incrustated with lymph, and surrounded by a *livid, vesicated* surface. The process of granulation is speedily arrested, and sloughing extends in all directions.

Prognosis.—The prognosis of this disease varies according to the peculiar circumstances of each case. Other things being equal, it is more fatal as an epidemic than when it occurs sporadically—in constitutions that have suffered from privation, fatigue, intemperance, etc., than in the young and vigorous. The violence and extent of the disease exerts also a marked influence upon its progress—the danger being less when this is slight, and correspondingly greater when it is considerable. Complications involving lesion of internal organs, as the brain, lungs, and liver, always portend evil, and should induce a guarded prognosis. Before the pathology of this disease was understood by the profession, hospital gangrene was an extremely-fatal disease. But of late years, since the treatment of ulcers and management of hospitals have become so much improved, it is of comparatively rare occurrence; and when it does appear, it seldom evinces those formidable and intractable characters that marked its progress in times past. The mortality formerly was very great: one-third of those attacked succumbed to its violence, and in some instances fully one-half perished. “In truth,” says Miller, “we believe that few hospitals grow *old* without contracting a tendency to the generation of this trouble, more or less.” Death may be caused by mere exhaustion of the vital powers, in consequence of the extreme violence of the morbid action; or from the occurrence of repeated hemorrhages, as when an important vessel is laid open during the sloughing process. There is a class of cases by no means uncommon, in which, although the suffering is very great, death is apparently occasioned by a poisoned state of the system, produced by purulent infection or the formation of secondary abscesses. The time at which death occurs varies from a few days to several weeks from the commencement of the attack.

Treatment.—One of the chief objects in the management of this epidemic is, of course, to arrest its spreading. For this purpose the utmost cleanliness and care should be observed. The vessels employed should be thoroughly scoured after use, and the bandages destroyed, that they may not be reapplied on an uninfected subject. The wards should be perfectly ventilated, walls whitened, the floor carefully washed with a solution of the chlorides, and the apartment fumigated with chlorine gas.

The progress of the local affection must be stayed, if possible, by both *external* and *constitutional* means. This is accomplished by gentle and soothing applications. The most successful have been a weak solution of the tincture of iodine applied to the entire surface, followed by cold or warm water dressings, whichever seems most grateful to the patient's feelings. Arnica or hydrastis lotions, composed of one part of the remedy to six parts of water, have a soothing effect upon the diseased structure. The watery extract of opium, and chlorinated poultices, have their advocates as efficacious remedies, as well as poultices of yeast, charcoal, and bark. When the patient experiences great restlessness, pain, irritability, and sleeplessness, which generally attend the severe grades of the disease, a judiciously-selected dose of the proper remedy to secure *sleep* and allay the excitability of the system will be found exceedingly serviceable. After this, it will be found that the constitutional remedies act more promptly and beneficially in controlling and limiting the progress of the disease. By this means I have frequently experienced the most gratifying results, even when the disease seemed to have withstood all former treatment. In the event of hemorrhage from a considerable artery, it is better to ligate the vessel at its bleeding point, if the tissues are firm enough to hold the ligature; if not, a stick of nitrate of silver, whittled down to a fine point, may be introduced within the mouth of the oozing vessel, producing coagulation of the blood, and consequently a blocking up of the gaping wound. *Persulphate of iron* in substance, applied directly to the open vessel, is highly extolled as a remedy of great efficacy in such cases. When all local means fail to arrest the hemorrhage, recourse must be had to amputation as a dernier resort. *Bromine*, externally and internally, was used by army surgeons during the late rebellion in the United States, it is said, with the most beneficial results.

The *constitutional treatment* of this disease must have for its object the removal of the combined state of *debility* and *irritation* in which we find the patient. The diet, especially in the latter part of the disease, should be highly nutritious, and given in as concentrated a form as possible. The apartment should be thoroughly ventilated, and all foul dressings immediately removed. If the bowels become obstinately constipated, they should be relieved by simple measures, such as simple enemata or the milder laxatives, their object being merely to unload the intestines and rid the patient of the irritation depending upon the presence of the long-contained ingesta. A liberal supply of stimulants, especially those which contain nutritious material, may be advantageously employed during depression of the vital forces, such as milk-punch, wine-whey, egg-nog, etc., while the patient is using the indicated constitutional remedies. The principal internal remedies are *lachesis*, *arsenicum*, *secale*, *phosphorus*, and *crotalus*, according to the indications, as more fully shown in the Treatment of Mortification.

SECTION VIII.

BED-SORES.

When a patient is obliged to remain in one position for a long time, or during a tedious course of treatment, with the weight of the limb or of the body pressing on one or more points, the risk of a local destruction of the tissue is incurred, to which the name of *bed-sores* is commonly applied. At first there is perceived a slight and evanescent redness of the part, which gradually assumes a darker appearance—becoming the focus of a passive and degenerate species of inflammation—and soon results in a local destruction of tissue and the formation and separation of a slough. This is generally accompanied with but little pain, so that the destructive process has sometimes considerably advanced before the attention of the surgeon is called to it. Wherever, therefore, there is the slightest probability of such an occurrence, the attendant should be continually on the alert to prevent it. The constitution of the patient is generally undergoing a severe trial; and this additional source of irritation may not unfrequently turn the scales against the powers of life. The *cause* of the sore is to be found in the

continual pressure on the part. This pressure, after a while, interferes so materially with the vital processes going on in the tissues (which are already weakened by sympathy with the constitutional trouble), that the life of the part is destroyed, and we have an instance of local death, or mortification. The dead tissues undergo the process of sloughing, and leave a granulating ulcer below, which, if circumstances are favorable, heals in the usual way. Sometimes these sloughs penetrate so deep as to expose the bone. This may occur extensively, or in so many localities that the constitution sinks under the constant drain upon its powers; and the patient consequently dies from the effects of the bed-sores, though he recover from the primary affection. Should the mortification extend to the bone and expose it to the influence of the atmosphere, exfoliation of the same will generally occur, with all its continued and exhaustive effects. Sometimes the lower portion of the spinal canal is laid bare by the process, and the patient dies from the injurious effect of such exposure of the vertebral nervous system. The parts most liable to be affected with bed-sores are the *shoulders*, *sacrum*, *trochanters*, *heels*, etc. The surgeon should, therefore, in view of the destructive effects that may occur from long-continued decubitus, examine from day to day the condition of parts most exposed, and overcome the predisposition by local and constitutional treatment.

Treatment.—The treatment in such cases is rather preventive than curative. As soon as the production of a bed-sore is apprehended, we should endeavor to remove or alleviate the pressure and to preserve the healthy action of the tissues. The skin should be kept clean and dry, and the part may occasionally be bathed with arnica lotion, camphorated spirits, lime-water, etc. — care being taken to protect the surface from undue pressure by the adjustment of pillows, compresses, air-bags, etc. A water-bed, if attainable, may be used with great benefit; and the position of the patient must be changed as often as the circumstances of the case will prudently admit. When the skin becomes chafed and the disease is fairly developed, the spot should be dressed with calendula or hydrastis lotion, in order to limit the process and hasten the formation of granulations. The general health must also be carefully attended to, and the strength supported by a generous diet, with a due regard to hygienic regulations. Constitutional remedies, such as calc. c.,

silicia, mercurius, hepar sulph., nitric acid, sulph. lycopodium, calendula, etc., must be given to overcome any systemic dyscrasia that may exist. If the suppuration is extensive, with more or less fetor arising from the abraded surface, disinfectants may be advantageously employed, such as charcoal, or, what is better, Labarraque's solution, which is the chlorinated solution of soda.

CHAPTER III.

PYEMIA, OR MULTIPLE ABSCESS.

SECTION I.

PYEMIA.

THIS affection depends upon a diseased condition of the blood, and is attended with profoundly - evil symptoms, and too often followed by fatal results. It is preceded by some species of inflammation already advanced to the suppurative stage. A picture of the disease is given in the following language:

Diagnosis.—"You have a patient, perhaps perfectly well in all other respects, but under treatment simply for some suppurating wound, which may cause you no anxiety at the time, nor be the source of any great deal of annoyance or pain to the individual. Suddenly he is taken with severe chills, which in some cases assume a certain degree of periodicity in their attacks, with an accompanying, or rather an intervening, fever; the pulse gets small and frequent, the breathing rapid, the skin dusky and yellowish; and this color will often extend to the conjunctivæ. The countenance assumes an expression of great anxiety, for the whole system is instinctive of its danger; and the breath has a peculiar, sweetish, fermentative, sickly odor, similar to that exhaled in some low forms of fever. The wound, meanwhile, is apt to take on an unhealthy appearance; its secretions dry up or assume an ichorous character, and are apt to slough and extend, forming a foul and unhealthy ulcer. Depression soon comes on; the patient falls into a stupor, or low delirium, from which, however, he is easily aroused; sordes

gather on the teeth; a brown coating covers the tongue; the pulse beats with an uncertain and fluttering movement; the respiration becomes more and more frequent and difficult; the skin and conjunctivæ assume more and more the icteric tint of jaundice; and usually from the sixth to the tenth day, but sometimes earlier, diffuse suppuration begins to take place in different tissues, joints, and organs. If seated in the cellular tissue, or in the substance of muscles, there is much doughy swelling, with some redness; if in the joints, the swelling is often considerable, the pain usually intense and superficial—the patient screaming with the agony he suffers. These pains, which are chiefly seated in the knees, ankles, hips, and shoulders, often simulate rheumatism very closely. The symptoms of approaching death now show themselves, and the patient sinks, after falling into a condition of extreme emaciation and exhaustion. Profuse *sweats*, *diarrhœa*, *subsultus tendinum*, and *failure of voice*, close the scene.”*

This picture is the usual portrayal of the disease when it assumes its regular course. It may, however, appear insidiously, and progress quite extensively before these symptoms become cognizable to the surgeon. Sometimes it is preceded by the appearance of an unhealthy species of inflammation, either at the point of a wound or somewhere else, in the form of erysipelas, anthrax, phlebitis, inflammation of the absorbent vessels, injuries of joints, etc. There is no evidence of chill or other marked distress. After a while, however, the skin and conjunctivæ begin to be discolored; one or more joints become swollen and painful; pleuritic stitches affect the breathing; symptoms of pneumonic inflammation present themselves, and the disease gradually becomes apparant.

Pathology.—The pathology of this disease has been and still is the subject of a contrariety of opinion among medical writers. It has been affirmed by some that the blood is infected by absorption of pus in the circulation. This theory has, however, been pretty generally abandoned—such absorption having been proven to be impossible, by reason of the pus cells being too large to pass through the coats of the absorbents. Whenever purulent matter is removed by absorption, a pre-requisite to its taking place is the breaking down of the pus cells. Others contend that infection of

* Geddings's Lectures on Surgery.

the blood takes place through the orifices of ruptured veins opening into an abscess, or on some suppurating surface. A third theory is that the blood receives the pus cells from the inflamed inner surface of a vein or absorbent, or that suppurative phlebitis is invariably the cause. All agree, however, that it is a diseased condition of the blood, attended with profoundly-evil symptoms, and too often followed by fatal results. Some product of inflammation becomes intimately mixed with the blood, by which that fluid is literally poisoned, which in turn involves the whole system in oftentimes a fatal disease. Hunter, Arnott, Berard, and others, contend that a distinct relation can be traced between pyemia and suppurative phlebitis, and regard the former dependent on the latter. Mr. Henry Lee argues a previously-deteriorated condition of the blood as a requisite to the disease. Erichsen admits that in some cases phlebitis is the cause of purulent infection, and grants that this explanation would be conclusive "if it could be shown that phlebitis was the only, or even the most frequent, form of diffuse inflammation occurring in connection with pyemia, and that it always occurred as a precursor or concomitant of the blood affection." But his experience does not justify him in adopting this opinion, having frequently found in the dead-house "conclusive evidence of diffuse inflammation as well as of phlebitis." He sums up the case in the following words: "Pyemia, though frequently coexisting with, may occur independently of, suppurative phlebitis, and can not in all cases be necessarily considered a consequence of that disease." M. Sedillot attempted to disprove the theory that the origin of the disease is always in the blood itself, by pointing out the fact that a disease in all essentials the same can be produced by the injection of pus into the circulation.

The most rational belief is that this purulent fluid enters the circulation through the medium of a ruptured or divided vessel. As it is known that air does frequently enter a vein, and by flowing onward into the heart sometimes produces the most serious effects, just so the globules of pus may be received into a ruptured vein or capillary, and, carried along with the current of blood, become mixed with the blood. In some instances of purulent infection this has been demonstrated. It may, therefore, be justly concluded that any cause which is capable of introducing pus into the circulation may produce this disease. The pus corpuscles can

not be absorbed as such, but they may in some cases enter through the ruptured walls or divided extremities of the vessels, and in this way occasion the disease called pyemia, and which is often so disastrous to the system. It is obvious, therefore, that the *vital* properties of the blood itself are seriously impaired by the presence of this abnormal element, in sufficient quantities in some cases to destroy life. The pus globules are by far too large to pass through these minute tubes; and the consequence of their presence in the blood is that they obstruct the capillary circulation and cause a congestion of the part, which impairs or puts an end to its vitality, and therefore causes it to suppurate. It is on this hypothesis that abscesses forming in the lungs, in the liver, in the spleen, in the cellular tissue, and, in fact, in every organ in the body, are accounted for; but most frequently in those parts in which the capillary system is most delicate. The vital processes in every portion of the economy are more or less interfered with, and life is, as it were, crowded out by this abnormal condition of things. The blood, in its physical characteristics, is necessarily changed—acquiring, according to Erichsen, a *thin*, dark-colored appearance; and after having been drawn from the body, forms a loose, spongy coagulum, from which a moderate quantity of rather turbid or milky-looking serum escapes. All the tissues—cellular, serous, nervous, muscular, and mucous—may be affected, even involving the arachnoid membrane, which has been found in a purulent condition; and abscesses have been known to exist in the brain, and in one instance even in the prostate gland.

Pyemic or multiple abscesses vary in different instances. It is rarely that a single one exists: most generally they occur in large numbers, varying from twenty to a hundred or more. Often the whole surface of the affected organ is completely studded with them; and, as occasionally happens when the deep-seated viscera are attacked, they may be numbered by thousands. As they vary in numbers, so they do also in size, and are seen from the size of a millet-seed to that of an orange—generally speaking, the more numerous, the smaller they are, and *vice versa*. When existing close to each other, they frequently become confluent, and resemble the pustules of variola. They are more frequently met with in the lungs than in any other portion of the body, in consequence of the disposition of that viscus to suffer more than any other organ in

any serious systemic trouble. Prof. Sedillot, of Strasbourg, who has given much attention to the investigation of this disease, and who has written an interesting and instructive monograph embodying the results of his observations, remarks that "in one hundred cases of pyemia, the lungs are affected in ninety-nine; the liver and spleen, one in twelve; the muscles, one in fifteen; and the heart and peripheric cellular tissue, one in twenty; the brain and kidneys suffering comparatively seldom." The joints also suffer severely, especially the larger articulations, from deposits of pus both within and without their cavities; as do also the subcutaneous and intermuscular areolar tissues, from large collections of purulent fluid, illy elaborated and intermixed with a large proportion of a plastic material.

Causes of Pyemia.—These may be divided into the *predisposing*, and *local* or *exciting*. Among the predisposing causes may be enumerated pre-existing diseases of the blood, produced by depression of vital action, as may occur from organic diseases, such as affections of the lungs and kidneys, exhaustion from surgical complaints, diseases of joints, accidents, amputations, parturition, unhealthy occupation, excesses in food and drink.

Local causes are those that occur from injuries, especially those involving to much extent the venous tissue; severe lacerating wounds; gunshot wounds; in fact, anything which causes inflammation and rupture of the venous tissue. During the progress of the American rebellion this disease was of frequent occurrence. Dr. Canniff attributes the frequency of the malady in military service to the hardships and exposures of camp life, "especially to the recently-made soldiers, and the excitement as well as the toil of forced marches and of battle; the protracted, painful, and often ruthless examinations made to find the balls which were supposed or known to be imbedded in tissues, and the injurious efforts made to recover them." He adds: "Examination by the finger was unhesitatingly resorted to and continued for some time. As a result of this, there could not be otherwise than laceration of tissue—a breaking up of fibrinous adhesions which nature had made in her anxious efforts to heal, and which then would speedily degenerate or die, thereby producing the material which leads to the disease."

Prognosis.—The prognosis of pyemia is very unfavorable. Few patients recover, and these remain for a long time in a crippled

and debilitated condition, liable at all times to attacks of various disorders. Miller remarks that "some patients emerge happily; others escape with life, bearing nothing but the scars of external attack; others escape with life, but permanently changed in both trunk and limb; *many sink and die.*" Death usually takes place, as already stated, within the first ten days from the attack, dependent upon the great nervous exhaustion consequent upon the continuous and severe pain and obstructed circulation which form the prominent characteristics of this affection.

Treatment.—Very little can be recommended concerning the curative treatment of this disease. In a few instances patients recover through the conservative powers of nature rather than by medicinal agents; but in a large majority of cases they succumb to its ravages. The two indications of treatment are—*first*, to remove if possible the exciting cause of the disease; *second*, to give tone and support to the system, that it may be enabled to throw off the toxical influences that keep up the morbidification.

If the disease has been induced, says a distinguished American surgeon,* by an accident or operation, attended with an open, suppurating surface, much may be done, in many cases, by the promotion of cleanliness, to prevent further mischief from the ingress of purulent fluid. This object is best attained by diligent, almost incessant, attention to the dressings and position of the part; the former being frequently changed, and the latter so arranged as to favor the escape of the secretions as fast as they take place. Detergent lotions are often serviceable, especially if they contain chlorinate of soda, but care must be taken that they are not so strong as to irritate; and it will be well, particularly if we have to deal with a foul stump, to throw them freely upon the parts with a large syringe, as this exerts a much better and wider influence than mere irrigation with a sponge. It will also be advantageous to keep the dressing constantly sprinkled with the chlorides, both with a view to allay feter and to purify the air of the apartment, which must be frequently renewed by opening the doors and windows. It is recommended that, to prevent the further ingress of purulent fluid into the system, if the surface is not too extensive, to use a mixture of one part of the acid nitrate of mercury to two parts of

* Professor Samuel D. Gross.

water, applied rapidly with a mop, to produce an alterant effect upon the tissues and thus close up the gaping mouths of the vessels. Well-regulated and careful compression may be applied, if the vessels are large and patulous, so as to close their mouths and prevent the introduction of the poison within the system. The French school have recommended the application of the actual cautery for the purpose of sealing the suppurating surface; but, like many other processes, it has been productive of little if any good, and long since has been abandoned by the intelligent portion of the profession.

When abscesses form and are accessible, they should be laid open freely, and stimulating lotions, poultices, etc., applied to the part, while a supporting and stimulating constitutional treatment should be directed. With reference to the homœopathic treatment of this disease, I can only recommend that those remedies be given whose symptoms correspond to the totality of the disease. Bryonia and mercurius sol. have been used without any marked benefit. In fact, I do not know of any medicine that corresponds homœopathically with this morbid condition; and we must content ourselves for the present to use such appliances as seem to do the most good. When it is impossible for the patient to sleep in consequence of great pain, a sufficient dose of opium may be given to secure this result. Rigors, or the chilly sensations that accompany the disorder, may be combated by arsenic, quinine,* nitric acid, and like remedies. The irritability of the stomach, so often present, may be counteracted by ipecac. antimonium tart., and zincum, together with the use of ice, taken in the mouth in small and frequent quantities.

Determinations to the internal organs, such as the brain, lungs, heart, liver, or spleen, must be met by the appropriate remedies in each case. If to the *brain*—ac., gels., bell., hyper. perf., quinine, glonoine, nux vomica; to the *lungs*—ac., arn., bell., opium, verat. vir., tart. emet.; to the *heart*—ac., bell., puls., opium, spigelia, cactus, gran., digitalis, verat. vir., hydrocyanic

* Dr. C. H. Weaver, of Beaver, Minn., thus writes: "I have cured three out of five cases of genuine pyemia with five-grain doses of quinine every hour, and immense quantities of alcoholic stimulants. In one case I gave over six hundred grains. The recoveries were astonishing; my patients were saved. What is remarkable, even these immense doses produced not a single drug symptom."

acid, arsenic, lachesis, cannabis; to the *liver*—ac., bell., gels., merc., podoph., bry., nux vom., lachesis, leptandra; to the *spleen*: ac., bell., nat. mur., digitalis, china, cannabis.

The state of the alvine evacuations should be attended to, and prolonged constipation prevented. Care should be taken, however, that violent catharsis be prohibited, as tending to break down the vital powers, already oppressed by the ichorhemia. A *simple laxative* that will unload the bowels is all that is required; and this, administered occasionally, as circumstances warrant, will meet the exigencies of the case. An enema of cold water given every four or five days will often suffice to overcome the torpor of the intestines and unload their contents. It should be understood that in the recumbent posture the digestive function is most active, and all nutritious material in the food is more closely assimilated than when in the erect posture and during exercise of the muscular system; hence less debris is left behind, and comparatively there exists a less demand for daily evacuation of the intestines. Food, also, being taken in limited and concentrated quantities, does away with the necessity of repeated purgation, or *attention to the secretions*, so much insisted upon by the allopathic school.

The system, weighed down and oppressed by the toxical influence, demands additional support, which may be afforded by a nutritious regimen, as adverted to heretofore. When marked tendency to hemorrhage exists, hamamelis, erigeron, or tannic acid, in addition to local expedients, may be beneficially employed.

Throughout the whole treatment attention should be given to the utmost cleanliness; the body should be frequently sponged with salt water, cold or tepid, as indicated by the feelings of the patient, and the bed and body clothes changed as often as need be; the apartment should be thoroughly ventilated. A change of climate may be necessary to perfect the cure—the patient observing the most rigid attention to hygienic measures during the protracted stage of convalescence. All these requisites will frequently be of the greatest value in preserving life; and, indeed, in two cases of which I am cognizant nothing but the closest attention to the rules laid down restored the sufferers to even a fair condition of health. The convalescence is always protracted, and the liability to relapse on the slightest exposure is imminent and exceedingly dangerous to life. “The histories of 754 cases are recorded in the register, the

post-mortem observations accompanying a large proportion of the fatal cases. These number 719, or $95\frac{35}{100}$ per cent. Pyemia supervened in 377 cases of gunshot injury in which no operation had been performed, and after 295 cases of amputation, of which 155 were cases of amputation in the continuity of the femur. The purulent infection was subsequent to excision of the shafts of long bones in 27 cases, and to excision of joints in 28 cases. It has been one of the great sources of mortality after amputations, and its victims are to be counted by thousands."*

CHAPTER IV.

IRRITATIVE, TYPHOID, AND HECTIC FEVERS.

SECTION I.

IRRITATIVE FEVER.

THERE are, besides inflammatory fever, other grades of fever known to the surgeon, such as irritative fever, typhoid, and hectic, each of which denotes a peculiar condition of the system and the operation of some antecedent morbid cause. These types of fever are connected, in the majority of surgical cases, with various local lesions of structure, not less different in their nature than the fevers themselves, though all partaking more or less of the inflammatory character. Thus, in inflammatory fever, the surgeon looks for a local morbid action of the simplest and purest kind. Apart from these varieties of fever, there are frequently witnessed in surgical practice those of an irregular character from their outset to their termination, and accompanied by lesions, either not inflammatory or so different from the ordinary forms of inflammation as to require a separate description and to imply different methods of cure. These fevers, having more or less of a remittent character, want the regular recurrence of hectic and the profuse and debilitating sweats that characterize that affection.

* Circular No. 6, Surgeon-General's Office—subject, Pyemia.

The febrile condition may present strong reaction, and even approach the inflammatory type; or there may be associated with it symptoms of debility and exhaustion, the pulse being small and weak, as is often seen in diffuse inflammation of the areolar tissue. This type of fever is usually associated with the asthenic form, the nervous system being specially indicated. It occurs in individuals whose mental powers have been overwrought, or whose nervous systems have been shattered by intemperance, fatigue, exposure, excesses, etc.

Diagnosis.—*Irritative fever* is characterized by irregularity in its actions, sudden exacerbations, and a rapid decline. The several febrile symptoms run high in the early stages; the pulse soon becomes sharp and small. On the other hand, the nervous phenomena of typhoid fever may be absent, as they are in the majority of cases. Or we may have slight delirium, occurring in paroxysms; or furious excitement, even verging into coma—the former being usually observed in persons of an hysterical or excitable constitution, the latter in those whose nervous systems have lost activity and power by irregular and dissolute habits. Finally, the fever may be of a protean character, shifting about from one to another of these types, under the influence of casual excitement or of the exacerbations and remissions of the local affection. Its characteristics are so varied and contradictory that it is almost impossible to arrange them under a specific head or refer them to a common type. Being of a diffused, congestive, or dynamic character, and frequently connected with a prevailing epidemic, it is frequently the cause of death after surgical operations. At one time it may take its origin from a wound, as from a central starting-point, and assume the various forms of erysipelas, diffuse inflammation of the cellular tissue, inflammation of veins and absorbents, and diffuse suppuration of bone; at another it occurs as a consequence of those secondary affections (oftentimes the result of surgical interference) in which the liver, lungs, brain, and gastrointestinal mucous membrane are implicated. The most frequent and fatal of these various complications is irritation of the lungs, which results in congestive inflammation of that organ and possibly the death of the person.

Treatment.—The treatment of irritative fevers must be conducted on general principles. In consequence of their protean character,

embracing almost every range of diseased nervous power, no definite system of medication can be given. Suffice it to say that each case, possessing distinctive peculiarities, will have to be treated in accordance with those peculiarities or phases. The remedies most relied upon are aconite, belladonna, bryonia, arsenic, iodine, china, phosphorus, nux vomica, baptisia, ignatia, and cannabis.

For a more special consideration of the treatment of this affection, as well as its corresponding types—hectic and typhoid fevers—the student is referred to the conclusion of this chapter, immediately following Typhoid Fever.

SECTION II.

HECTIC FEVER.

This term is applied to a type of fever different from the inflammatory and irritative, and presents certain marked and distinguishable traits. Hectic fever is cognizable by its frequent remissions and exacerbations, usually periodical, and occurring often twice in the twenty-four hours; by the sweating which attends its paroxysms, causing great exhaustion and emaciation; also by frequent recurrence and long continuance of the fever, without the disorder of the nervous and assimilative functions that accompany other fevers of similar continuance and duration.

Diagnosis.—Hectic fever is invariably connected with some severe organic disturbance or change of structure, and is an affection almost always accompanying profuse suppuration, particularly in an important organ. It is under this aspect that its true character is developed and the most *distinct* exacerbations and remissions induced. When it is fully formed in the course of such local affection, there is at least one daily paroxysm—often preceded by chilliness and sometimes shivering—attended by great heat of skin, flushing of the face, and burning sensations in the palms of the hands and soles of the feet. The pulse is frequent and irregular, and easily excited by exertion, motion, eating, or any other disturbing cause. It is never so hard and full as in inflammatory fever, nor so small and compressible as in typhoid, but holds a medium place between the two, according to the degree of exhaustion and the amount of febrile action. This state lasts for a few hours only, and then subsides by a colliquative sweat. The sweat may be

preceded by a *diarrhœa*, which increases the danger. The urine differs but little from that of inflammatory fever. The tongue may be a little dry during the paroxysm, and is accompanied with thirst, but becomes moist again as soon as the paroxysm is over. The eyes are free from suffusion, and flushing of the face is usually confined to a spot in the middle of the cheek, the color being in strong contrast with the general pallor. These exacerbations occur almost invariably toward evening, reaching their height about midnight, and terminating in the sweating stage toward morning. The intervals are usually free from fever. In the advanced stage fever is nearly constant, but evening exacerbations and morning sweats continue to the end. Emaciation gradually increases, but the appetite and digestive functions are little affected. The only exceptions to this are when the assimilating organs are directly involved, as in many of those cases of hectic falling under the notice of the physician. In the ordinary forms of hectic occurring under the practice of the surgeon, and connected with external disease, the appetite continues, and food is taken during the remissions with considerable relish. The tongue may be natural in appearance, or it may present a slight fur, with red edges; often it is preternaturally clean and glistening; it is rarely much coated, and never permanently dry and rough, as in typhoid fever. The bowels are frequently constipated, as in other diseases where there is long confinement in bed; but more frequently they are natural. Unlike typhoid fever, there is an absence of nervous participation throughout the disease. The mind remains clear; in some instances the mental faculties are in an unusually vigorous and active condition, even when there is much emaciation. *Sleep* may be light and frequently broken, but it is obtained in sufficient quantity to preserve the cerebral functions in a state not far removed from health. Emaciation proceeds to the last stage; the features assume a shrunken and withered appearance; the eyes are sunk in their orbits; the bones are prominent; the flushing subsides into a pallid, leaden hue; and the whole expression wears the appearance of the *facies hippocratica*—a designation used by old authors, and truly indicative of the character of the disease. This is the sure index of approaching dissolution.

Prognosis.—The prognosis of hectic fever is influenced by such a variety of circumstances, says a recent writer, as to defy anything like a definite statement. In general it promptly disappears with

the exciting cause, provided the inroads made by that cause have not been productive of any serious disorganization. Should this have happened, the case will probably have an unfavorable issue, the hectic continuing in a modified form down to the fatal crisis. The fortunate manner in which hectic disappears after the removal of the disease that occasioned it, is much more frequently witnessed by the surgeon than by the physician, whose practice more generally brings him in contact with all kinds of incurable organic maladies. The most severe and protracted hectic consequent upon the disorganization of a tuberculated joint will almost immediately vanish after the removal of the limb, and the system will rapidly recover from the effects of the previous disturbance.

Treatment.—The indications in the treatment of hectic fever are: *First*, to remove the exciting cause whenever this is practicable; *second*, to administer those remedies which, from their well-known pathogenesis, are *en rapport* with the morbid action. The first of these indications is oftentimes best accomplished by the knife, as when the disease is dependent upon and is kept up by a tuberculosed joint or a suppurative compound fracture, the removal of which often promptly restores health and tone to the prostrate system. If the cause be inaccessible, the case must be treated by the remedies hereafter mentioned, the proper remedy being selected to meet the totality of the symptoms. Careful attention to hygienic measures, nutritious food, and all means that tend to exalt the already-depressed physical powers, will be found exceedingly serviceable in assisting the action of the remedies employed to overcome the disease. The regimen best adapted for this purpose is—the richer kinds of animal broths, jelly, tapioca, arrow-root, and milk, with frequent draughts of milk-punch, wine-whey, egg-nog, beer, ale, or porter. To procure sleep, to relieve pain and irritation, it may be proper to administer an intercurrent remedy at night, continuing the appropriate remedy in the morning. The exhausting effects of diarrhœa and perspiration, so frequently existing as colliquative symptoms, must be promptly attended to, and one of the subjoined medicines may be selected for that purpose. Night-sweats, which so greatly prostrate the patient, may be counteracted by mercurius, phosphoric, or one of the mineral acids, of which sulphuric is probably the most efficacious. If the sweats and fever exist at the same time, then aconite will become a valuable remedy.

Whenever the local disease that induces the hectic will not be rendered worse by exercise, riding or walking in the open air at suitable hours frequently has a most marked influence upon the disorder by restoring the appetite and strength and giving increased tone to the nutritive functions. If the malady occurs in children, they may be carried out in their nurses' arms, or wheeled around in small carriages adapted to the purpose. Occasionally a complete change of air and diet—removal from the dry, mountainous or elevated regions of the West, to the cool, salubrious air of the sea-side, or *vice versa*—has been found to be exceedingly beneficial in a curative point of view. The greatest attention should be paid to cleanliness; the body should have frequent spongings with salt water, the linen changed daily, the excretions promptly removed, and the apartment kept thoroughly ventilated. The remedies that have been found of exceeding efficacy in controlling the morbid action are: *aconite*, *arsenicum*, *cinchona*, *phosphorus*, *belladonna*, *baptisia*, *calcareae*, *nux vomica*, *cocculus*, *ippecac*, *silicia*, *sulphur*, *acid hydrocyanic*, *mercurius*, *acid phosphoric*.

Arsenicum.—When there is great debility; dry, burning heat of skin; thirst, with inclination to drink frequently, but little at a time; restlessness; unrefreshing sleep; palpitation of heart; frequent and watery evacuations; occasional rigors, etc.

Cinchona.—When the cheeks are sunken; paleness of the face; tendency to perspiration from the slightest exertion; excessive hunger; weakness of digestion; dryness of the skin; spontaneous sweating at night, with sensations of chilliness; distention of the abdomen from flatus; watery, painless diarrhœa.

Acid Phosphoric.—Colliquative diarrhœa; clammy and nocturnal sweats; chilliness; shivering toward morning; emaciation; extreme lassitude; pain in the chest; shortness of breath; livid appearance of the cheeks.

Sulphur.—Hectic flushes upon the cheeks; feverish heat in the evening; thirst; slimy stools; oppressed respiration; night-sweats; perspiration after the slightest exertion, or toward morning; dry, hard stools; suppressed eruption.

Calcarca Carb.—Flushes of heat; great debility; continued chilliness; redness of the cheeks; extreme dejection after speaking; perspiration after the slightest exertion; weak and sluggish digestion; anxiety of countenance; spontaneous sweats at night.

Nux Vomica.—Want of appetite; bitter or sour eructations after a meal; vomiting of ingesta; great debility; perspiration excited by any slight exertion; paleness or sallowness of the face; partial heat; coldness and shivering; pains in the back and loins; constipation; dread of the open air; and constipation alternating with diarrhœa.

Other remedies may be employed to meet the various complications as they arise throughout the treatment—which must be determined by the totality of symptoms, as found to exist in each case. The diet should be light, nutritious, and of easy digestion; and regularity in meals should be positively enjoined.

SECTION III.

TYPHOID FEVER.

This fever—a frequent concomitant of surgical operations or those diseases requiring the aid of surgical skill—is different in its nature from either of the preceding types. While in the inflammatory there may be local morbid action; in the hectic some organic change, or some exhaustive discharge of a suppurative kind—in the typhoid there is marked disturbance of the cerebral functions *primarily*, and secondarily of the entire nervous system. We are thus prepared at the onset to attach that importance to this affection which it so justly demands. The functions most important to life are deeply involved; and if the affection be protracted, it is very prone to terminate unfavorably. There is probably no one disease held in so much dread by the practitioners of the allopathic school as this species of fever, and none in which the therapeutics of the homœopathic school are more brilliant in their curative result. In its purest form, says Miller, typhoid fever probably never occurs except in consequence of some cause of a peculiar and specific nature; and it has generally been ascribed to the entrance of some substance, known or unknown, as a poison into the blood. In many cases this view is borne out by the fact of its being distinctly contagious; and it will hereafter be shown, in the consideration of poisoned wounds, that several of the animal poisons have the power of producing this condition of the system in a very aggravated form. Some of the purest examples

of it are also found among the fevers which fall under the care of the physician—being unconnected with injury, or indeed with local disease of any kind.

Diagnosis.—Typhoid fever is ushered in, like the inflammatory type, by premonitory chills and shiverings, and by a feeling of general *malaise*. Its approach is often gradual, and the premonitory symptoms may be spread over three or four days. The change from this stage to reaction is much less rapid and violent than in the inflammatory type; and let me here impress upon the student an important symptom in diagnosing these two diseases in their *earlier* stages of development. The *premonitory* symptoms and the commencement of reaction in the typhoid *precede* the appearance of the local symptoms for some hours, and even days; while in the inflammatory, they *follow* these symptoms. Besides this, the reaction, when established, is characterized by a peculiar appearance of debility and torpidity of intellect; the eye is dull and suffused; the physical system is greatly depressed; the heat of skin is only slightly elevated, and oftentimes does not exceed the normal standard. The pulse is quick and frequent, ranging from 90 to 120; and after the disease has made some progress the pulse will fall and become soft, and oftentimes small, affording a strong contrast to the full, hard, and bounding pulse of inflammatory fever. The tongue now loses its furred character, becoming more and more dry; the white fur on its surface changing to a thick brown crust of mahogany color, dry and rough to the touch, and presenting transverse and longitudinal cracks and furrows. The teeth and gums are covered with brown *sordes*; the appetite is gone; thirst more or less considerable. But the most marked and most serious of all the symptoms are those referable to the nervous system. In the initiatory stage of this fever the cerebral symptoms show a sluggishness and oppression of their functions; the patient seems confused and abstracted; his mind fanciful, disposition restless. In severe cases there is more or less complete sleeplessness; and in almost every instance sleep is disturbed and full of unpleasant dreams. Often you will find headache in the earlier stages of the disease, but little or no complaint will be made unless questions are directed in this quarter. In addition to these symptoms there may be incipient delirium at first observed at night; it may be active and furious, but most commonly has the appearance of unintelligible

mutterings, or *typhomania*, as it is termed, from which the patient may be easily diverted by speaking to him quickly and authoritatively, but soon relapses into his former position. The disease now begins to assume a serious aspect. As it advances, the delirium becomes more constant and more incoherent; the mental faculties become more obtuse; the mind can not be so readily recalled; there is incessant restlessness, and an almost uncontrollable disposition to rise from the bed; hearing becomes morbidly acute; the eyes have a vacant stare, or are perpetually wandering, and become more suffused, and the pupil is either natural, or, in the worst stages, contracted, as if under the influence of opium. The urine in this stage of the disease is frequently suppressed, and always scanty; and the blood presents evidences of urea, showing that the kidneys are complicated with the morbid derangement. The digestive organs are disordered; emaciation increases; the features are sharpened, and prominence to the angles of the bones is observed throughout the body. All reparative actions cease; discharges from wounds dry up; and on the other hand, new wounds are apt to be formed, by ulceration or sloughing, over the sacrum, scapula, trochanters, and other prominent points of the skeleton. Sweating is exhausting and profuse; the pulse is reduced in force and fullness, is very rapid and soft, and sometimes intermitting; prostration continues, succeeded by *coma*. The irritability of the nervous system, from sheer exhaustion, passes into comparative repose—a repose which is like the calm that precedes the storm, so destructive to life. The delirium now ceases or merges into complete torpor; the breathing is stertorous; the stools and urine are passed involuntarily; the pupils are dilated; and insensibility is complete. The movements are purely automatic, the fingers being employed in picking the bed-clothes or catching at imaginary particles in the air; the patient sinks to the bottom of the bed; respiration becomes slower and more feeble, and finally ceases, and the heart's action is suspended either simultaneously or a few minutes after. This is a picture of the disease as it progresses toward a fatal termination; but *more frequently* a return to health may take place at any period of the disease. The favorable change is manifested by a gradual subsidence of the pulse, with moistening and cleaning of the tongue, but above all by a cessation of the delirium and the recurrence of sound, natural sleep. The skin becomes

moist; the secretion of urine increased and turbid; the sweats disappear; the appetite returns; and the patient moves on gradually to a condition of health.

Treatment.—In the management of all fevers, the first object of the practitioner should be, if possible, to remove the exciting cause. When this is of a local character, as in many surgical fevers dependent upon pre-existing disorders either local or general, the surgeon's first care should be, if possible, to remove the cause of the trouble. Unhappily, this can not always be done—as the cause, in many obstinate forms of the irritative, hectic, and typhoid types, is beyond his ken, depending upon some vitiation of the whole system prior both to the fever and the local affection which may accompany it. In such cases the fever must be treated not as a symptomatic affection, but as an independent and destructive disease. Under these circumstances the surgeon will have to employ those agencies which from their well-known action affect the organism similarly to the diseased development. If it be of the acute inflammatory type, immediate danger need not be apprehended; but if nervous prostration or exhaustion occur, and the disease begins to assume a tendency to the irritative, typhoid, or hectic varieties, he should feel deeply solicitous of his patient's welfare. If the original type be typhoid, the nervous functions, the state of the circulation, the secretions and excretions, demand his watchful care in the selection of those remedies which are *en rapport* with this diseased condition of the system. If *hectic* be the predominant form, the immoderate sweats and the reaction must be subdued by appropriate medication; at the same time the strength is to be supported by proper diet and regimen. If *irritative fever* occur, the pain and nervous irritability, want of sleep, and other dangerous symptoms that may arise, must be combated by the proper remedies. Care should be taken that the selected remedy cover as perfectly as possible the actual characteristics of the disease; not magnifying into importance a symptom or two of questionable relevancy, but giving the remedy that has a specific affinity for the affection in its totality. He should avoid the pernicious practice of endeavoring to combat every isolated and perhaps transitory symptom by a too frequent changing of the selected remedy, without regard to those great indications which ought to form a stable and consistent basis for all minor arrangements. At the same time he

should not overlook such local appliances or external means of comfort as will insure even present relief and freedom from suffering. In the treatment of individual forms of fever, there is, perhaps, no part of medical practice which requires such a perfect knowledge of the *materia medica*, joined with the teachings of experience and observation, as does the recognition of the different varieties of fever, the detection of formidable and favorable symptoms at their onset, and the judicious selection of the indicated remedy. Daily and hourly changes, that so frequently occur in these affections, demand of the true physician the most careful scrutiny to conduct the case to a favorable termination.

The following practical observations of a recent writer may be of importance to the surgeon in their application to every form and type of fever:

1. Mere acceleration of pulse is not necessarily an unfavorable symptom, especially in fevers of an inflammatory kind and united with strong reaction. But when, in fevers of typhoid type, the pulse rises up to or beyond 120—more especially if at the same time it be small and weak, with few of the other signs of reaction—there is usually great danger of prostration before the termination of the attack. Strong reaction at the beginning of fever is to be regarded, generally speaking, as indicative of a vigorous state of the constitution, and, as such, is to be considered of favorable import. Cold affusion, or cold sponging of the body, may be beneficially employed, especially where the surface is dry and pungent. The sensation it produces is not only grateful to the feelings of the patient, but it also stimulates the capillaries and assists in bringing about moisture of the body, and consequently a breaking up of the diseased condition within. Conjoined with this, in marked inflammatory complications, those remedies that act specifically upon the circulating system are to be administered until the force of the inflammation has subsided.

2. The prostration of the nutritive and assimilating functions is not usually a source of danger in fevers of short duration. But in all protracted fevers, if continuing beyond a fortnight, the danger is increased; and fevers so protracted almost invariably tend toward the typhoid type, or some form indicating exhaustion. Hence, it is of much importance, while giving the appropriate remedy, to convey into the system from the beginning such quantities of the most

digestible and least stimulating aliments as the weakened assimilative organs will bear.

3. The state of the secretions, also, is an important consideration to guide the practitioner in the selection of his remedial agents, viz: the urine and cutaneous transpiration. A moist condition of the skin, so much desired in the treatment of these affections, is a favorable omen; not so, however, is *copious* perspiration. When sweating occurs in a protracted case, without a crisis, it must be looked upon as of unfavorable import, leading to exhaustion, and requiring remedies to counteract it. In hectic, and other remittent fevers also, sweating may become a source of danger by frequent and sustained recurrence, and should be controlled by appropriate medication. Extreme scantiness of the urine, or diminution of its animal constituents, is fraught with danger, as it is very often followed by typhoid phenomena. It is important, therefore, that this secretion be watched from day to day, lest its accumulation in the bladder produce the most injurious results. In such cases the catheter should be introduced and the urine be drawn off as often as necessary

4. The phenomena of collapse, with loss of animal heat, and small, weak pulse, possibly frequent and intermitting, are always to be considered of the gravest import. When such a condition occurs, it is to be met by the administration of those remedies that will be mentioned hereafter under the appropriate head.

5. The nervous system, in all fevers, requires close attention, but particularly in the typhoid. This class of symptoms, when occurring in the course of inflammatory affections, generally manifest themselves about the second week, and oftentimes assume a dangerous character. It is of the highest importance, therefore, that the practitioner should watch the earliest premonitory signs of this threatened complication, that he may be enabled to counteract them at the onset. Among these signs there is no more important one than wakefulness. Unless the patient has a certain amount of refreshing sleep, the tone of the nervous system becomes impaired, and the constitution begins to be undermined. This will be shown by delirium, at first mild, with slight wandering fancies and incoherencies of expression, but soon assuming the furious and maniacal form, or low and muttering variety, with great prostration of the intellect, and final stupor and death. To avert this formidable

train of symptoms, he should be constantly on the alert. He should inquire daily as to the manner in which the previous night was spent. He should observe if the eye be clear and bright; the answers intelligent and quick; the mind free from fancies; and if these indications of a sound working brain be not present, no time should be lost in correcting this nervous disquietude. A dose or two of the indicated remedy, given just previous to the usual sleeping hour, should be administered, in order to procure the proper amount of refreshing sleep; after which, the treatment may be continued as before, or as the circumstances of the case demand.

The remedies of most value in the treatment of the different forms in which typhoid fever appears may be enumerated in the following order, viz:

In **cerebral typhoid**—Aconite, baptisia, belladonna, bryonia, hyoscyamus, muriatic and phosphoric acids, opium, rhus toxicodendron, stramonium.

In **pulmonary typhoid**—Aconite, arsenic, bryonia, baptisia, belladonna, china, mercurius, phosphorus, sulphur, tart. emetic, senega, veratrum.

In **gastric typhoid**—Arnica, baptisia, bryonia, chamomilla, china, cocculus, digitalis, gelseminum, ignatia, nux vomica, staphisagria.

In **abdominal typhoid**—Arsenic, belladonna, bryonia, camphor, carbo vegetabilis, opium, mercurius, phosphoric acid, muriatic acid, staphisagria.

The remedy in these cases should be selected with care and judgment, by comparing the pathogenesis of the drug, as given in our materia medicas, with the totality of symptoms manifested by the diseased action. Having made the selection thus, it is recommended that it be not too hastily abandoned for slight or unsubstantial reasons, but continued until evidences of its inadaptability are plainly visible. It is impracticable, in a work of this kind, to give all the indications of remedies in the treatment of the various diseases that fall under the care of the surgeon; it is enough to mention them. Their action and appropriateness must be acquired by a constant and thorough perusal of the materia medica, which should be the daily companion of the practitioner if he would become proficient in his art.

CHAPTER VI.

HEMORRHAGE.

A DISCHARGE of blood, as an effect of inflammation, is, on the whole, says Gross, of an uncommon occurrence. It may take place in the interstices of the organs and tissues or upon their free surfaces, and is generally a result of the rupture of some of the vessels of the part, in consequence of the manner in which the blood is sent into them by the heart at a time when their walls, weakened by the morbid action, are incapable of offering much resistance. It is probable that, when the blood is in a dissolved condition, as occasionally happens in scurvy, typhoid fever, and other low states of the system, the hemorrhage may occur as a product of secretion, or, perhaps, rather as a mechanical transudation, the fluid percolating through the coats of the vessels as water does through the bladder—the globules passing off in an altered and disintegrated form.

Constitutional Effects.—The constitutional effects of hemorrhage depend upon the quantity of blood lost, or the rapidity with which it is poured out, and on the state of the patient's system at the time. When a large quantity of blood is suddenly lost, as when a large vessel is divided, the patient falls down in a state of syncope; the surface is pale and cold; the eyes and lips are livid; great restlessness and convulsions supervene; he sighs, gasps, and suddenly expires. If the quantity lost is not sufficient to produce death *immediately*, as just stated, the patient is seized with sickness and faintness; with coldness and pallor of the surface; great restlessness, thirst, noises in the ears, and partial or complete loss of sight. If the quantity lost be more than the last and less than the first description, and takes place slowly, the patient rallying between the recurrences of hemorrhage, a state of anemia is produced, which deranges to a greater or less extent all the functions. The result of this will be a paleness of the skin, a blanched appearance of the mucous membrane, palpitation of the heart, noises in the head,

amaurosis, a tendency to syncope in the erect position, oedema of the extremities, and general debility of the system.

After excessive loss of blood, at first the patient may rally gradually, and as the vital fluid is reproduced in his system he may recover without any ill effects; or he may fall into a state of anemia, which may, perhaps, never be completely recovered from, and be associated with various nervous derangements and local debilities. Hemorrhagic fever, which is nothing more than an irritative fever with anemia, may set in. In consequence of the small quantity of blood in the vessels, the tendency to reaction is feebly produced—the heart and arteries making violent efforts to propel the blood from the circulative center. The symptoms engendered by this state of the system are: a *quick, jerking, fluttering*, and *irregular* pulse; slight *flushing* of the face; *brilliancy* of the eyes; terminating in pallor of the countenance and syncope. If the hemorrhage eventually prove fatal, death will be preceded by excessive restlessness, delirium, and convulsions. The body of a person who has died from the effects of hemorrhage presents a peculiarly-blanced, semi-transparent, waxen hue; the alæ of the nose and finger-nails assume a livid look, contrasting strongly with the clear, yellowish-white appearance of the general surface. Inflammatory hemorrhage rarely takes place, says Gross, until the action of which it is a product has made considerable progress; hence, its appearance may generally be regarded as denotive of a higher grade of excitement than a mere deposit of serum, plasma, or even pus. When the discharge is copious, it may, provided it does not go too far, prove serviceable in the way of unloading the congested vessels, and thus favor the restoration to health. If, on the other hand, it be too copious, it may quickly induce fatal exhaustion or seriously interfere with recovery. The quantity of blood thus poured out varies in different cases and under various conditions, from a few drops to a few pounds. The most excessive hemorrhages of this kind take place from the mucous and serous surfaces, and from the cutaneous and intermuscular cellular tissues, as may be observed in diffuse erysipelas and in that variety of inflammation which is consequent upon snake-bite—the blood being dissolved by the specific virus and rendered more disposed to extravasation. Inflammatory hemorrhages frequently take place in scorbutic affections, when a somewhat similar condi-

tion of the blood exists; also, in pneumonia, when considerable quantities of blood are poured out in the air-cells of the lungs and the minute ramifications of the bronchial tubes. In dysentery, often, discharges of blood and mucus take place, and form characteristic symptoms of that disease. The fluid in these instances is not thrown out as pure blood, but as an admixture of other products—as lymph, serum, pus, mucus—which not only modifies its properties, but changes its appearance.

Treatment.—In the treatment of inflammatory hemorrhage, our reliance is mainly to be placed upon those remedies which produce a spasmodic rigidity of the coats of the capillary vessels, thus giving tone and vigor to the dilated tissues and preventing further exudation of blood. These conditions are met by the use of aconite, squilla, ferrum, millefolium, ipecac, arsenic, erigeron, hamamelis, tannic acid, and plumbum.

Aconite is serviceable when the reaction is characterized by a *full, hard, and bounding* pulse; *flushed* countenance; *hot* and *dry* skin, with even a partial loss of consciousness. These symptoms frequently occur during an attack of pulmonary hemorrhage, the blood issuing from the mouth in considerable quantities, mixed with coagula. It is also serviceable in *epistaxis* and *hæmaturia*, when the hemorrhage is accompanied by marked symptoms of vascular excitement. In *metrorrhagia* during pregnancy, a few drops of aconite timely administered, in females of bilious and plethoric habit, has prevented miscarriage; also, in *menstrual metrorrhagia*, and in metrorrhagia setting in after miscarriage, it is one of the most reliable remedies. In *hæmatemesis*, also, it is of certain efficacy. If the discharge be so copious as to threaten exhaustion, recourse may be had to one or the other of the remedies previously mentioned, according to the characteristic symptoms in each case. If the discharge be comparatively slight, it may yield to cold applications, as cloths wrung out in cold or ice water and frequently renewed, or by bladders filled with pounded ice and laid in contact with the part. When the blood has been extravasated into the cellular tissue, among the muscles, or beneath the skin, aconite may be applied locally, as also arnica; pledgets of lint or linen saturated with either of the remedies and applied constantly to the seat of difficulty. If the hemorrhage has been sufficiently copious to distend the parts, and by compression injure

the tone of the capillaries, recourse may be had to free incisions, which should be made as soon as this condition becomes manifest. When the hemorrhage is internal and proceeds from a serous membrane, as the *pleura* or *peritoneum*, and surgical interference becomes necessary to evacuate the fluid, the trocar may be used. It is, however, an expedient extremely dangerous to life, and, if the blood is coagulated, of doubtful efficacy. To be productive of real benefit, it is manifest that the operation should be performed *early*, and before coagulation has taken place, and then only when the exigencies of the case imperatively demand this procedure. The treatment of the various forms of hemorrhages which fall under the observation of the practitioner will be more fully discussed in a subsequent portion of the work referring to these affections.

CHAPTER VII.

TEXTURAL CHANGES—SOFTENING, INDURATION, HYPERTROPHY, AND ATROPHY.

SECTION I.

SOFTENING.

INFLAMMATION frequently terminates in softening of the tissues, or, as the French pathologists term it, *ramollissement*. It is characterized by a loss of cohesion of the affected structures, varying in consistency from the slightest change of texture to complete pulpefaction. The parts of the body most liable to this structural degeneration are the *lungs*, *brain*, *heart*, *liver*, and *spleen*, the *mucous membrane* of the stomach and bowels, the *spongy portion* of the bones, and the *articular cartilages*.

It is divided into *acute* and *chronic* softening, as it occurs quickly or slowly. In the *acute* variety the affected tissues are suddenly deprived of their natural elasticity—that is to say, within a period of two or three days. Thus, the lungs may be softened

during this interval to such an extent as to be entirely incapable of resisting the slightest pressure of the finger. In the *brain* and *spleen*, the loss of cohesion frequently takes place more rapidly than in the lungs. The *chronic* variety more frequently attacks the cerebral substance, and the mucous membrane of the colon and ilium, than any other portion of the body. It begins in the brain,* generally in a most insidious manner, often involving a considerable extent of structure before it becomes cognizable to the practitioner by decided characteristic symptoms. In the mucous membrane of the ilium and colon, also, it proceeds so imperceptibly that the serious nature of the disease is often overlooked in the earlier stages, and is only recognized when the most alarming symptoms are developed.

Prognosis.—The true nature of softening is not understood. "We can hardly, however," remarks Gross, "divest ourselves of the idea that it is not a species of molecular mortification, especially in its more advanced stages. Be this as it may, it is unquestionable that the loss of cohesion under such circumstances is entirely incompatible with the exercise of the functions of the part or its restoration to health. Many of its smaller vessels are completely obliterated, while the remainder are so crippled and paralyzed as to be scarcely able to propel their contents. Changes not less conspicuous are observable in the proper parenchymatous structure, which not only loses its natural consistence, but also its natural color; its cells are infiltrated with serosity—or serosity, lymph, pus, and blood; and its minute texture is no longer distinguishable by the aid of the most powerful microscope. If this is not death, or a condition closely approximating to it, what can it be? In the milder forms of mollescence the structure may retain some vitality, and may consequently be able, in time, to regain its original characters; or, what is more probable, may be rebuilt by plastic matter, after the manner of other broken-down and mutilated tissues, the first step in the process being the removal of the effete substance.

*The death of the late Senator Lane, of Kansas, was caused by *softening of the brain*, causing more or less frequent attacks of aberration of intellect. I attended him in consultation with Dr. T. G. Comstock, of this city, who became his professional adviser during the Senator's late visit to St. Louis. It was during a moment of mental aberration that he committed the act that resulted in his death.

There is a species of softening which is intimately connected with, if not dependent upon, obliteration of the vessels of the affected structures, with a consequent deficiency of blood and an impairment of nutrition. It is most frequently met with in the brain and spinal cord of old persons, and is generally supposed to be of a non-inflammatory character."

Treatment.—The remedies of value in the treatment of this affection will be arranged under respective heads. Thus, in

Encephalomalacia, or softening of the brain, the appropriate medicines are belladonna, bryonia, mercurius, nux vomica, phosphoric and nitric acids, calc. carb., silicia, sulphur, ignatia, and staphisagria.

Belladonna, in softening of the brain, is a remedy of value, and is indicated by the following symptoms: Loss of memory; depression of the sensorial functions; vertigo; hardness of hearing; imperfect sight; deep-seated, aching pain in the head; difficulty of articulation; dragging gait; until paralysis sets in. During the attack the patient does not wholly lose consciousness; he looks pale; features are disfigured; the pulse is small, feeble, and filiform.

Mercurius.—Encephalomalacia will be benefited by the use of this drug, especially in slow chronic cases resulting from continued exposure; constitutional tendency to cerebral congestions, in impoverished, cachectic constitutions; venereal excesses, etc. The cerebral degeneration is attended with imbecility; fits of wandering; dull and staring expression of the eyes; sallow complexion; haggard features; tremulous, feeble, hurried pulse; desire to lie in the recumbent position; with sopor, moist and warm skin.

Nux Vomica is useful in this affection, if the disease results from the too free use of spirits, wine, rich food, excessive mental fatigue, venery, etc., attended with obstinate constipation—if the brain is clear, but sensibility seems to be almost extinct; stuttering or inarticulate speech; paralytic weakness of the extremities; full and bounding pulse; or feeble and accelerated pulse, with coldness of the extremities.

Softening of the lungs may be successfully treated by aconite, bell., antim. c., mercurius, bryonia, and phosph. acid. The proper selection of the indicated drug will be more clearly pointed out by its pathogenesis, to which the reader is referred in the materia medicas of the homœopathic school.

Softening of the liver—Arsenicum, mercurius, bryonia, and nux vomica.

Softening of the spleen—China, arsenic, and ant. tart.

Softening of the ilium and colon—Belladonna, arsenic, aconite, ant. crudum, ipecac, pulsatilla, nux vomica, calcarea, phosph. acid, and creosotum.

Softening of the bones—Calc. phosph., ferrum, calc. ant., and staphisagria. *Vide* following case, from N. A. Journal of Homœopathy, vol. ix, p. 337 :

A little girl, ten years old, had a severe fall while descending the stairs, and received a hard blow upon the back, just below the shoulder-blade. The injury excited little attention until suspicions were aroused of beginning trouble in the spine, by *swelling, heat, pain, languor*, and tenderness at the point of injury. For eighteen months the disease persisted in spite of the treatment employed, the affected vertebræ making a prominent backward angle at the fifth or sixth dorsal vertebra. The pulse was hectic, and severe neuralgic pains affected the seat of injury, stretching downward to the lower extremities; with extreme emaciation, irritable bowels, and inclination to diarrhœa from the slightest irregularity in diet. The bodies of the fifth, sixth, seventh and eighth vertebræ seemed the chief seat of the bony absorption. Shortly afterward the case fell into the hands of a homœopathic physician. *Staphisagria*, third dilution, was prescribed, with the expectation that the urine would become lateritious in four or five days. The deposit in the urine occurred on the third day; the neuralgia ceased, and the patient went on to a complete recovery.

Inflammation of this character is interesting chiefly on account of its pathological peculiarities—occurring almost exclusively in internal organs, and presenting few symptoms indicative of its existence. The insidiousness of its approach, and the disintegration of tissue that marks the progress of the affection, have given little hope for treatment under allopathic therapeutics. Their remedies in the *acute* form are those agents which are calculated to reduce inflammatory action and favor the removal of deposits. In the *chronic* variety a mildly alterative course is recommended, embracing tonics such as cod-liver oil, quinine, and iron.

SECTION II.

INDURATION.

In nearly all inflammations, whatever may be their cause, site, or degree, remarks Gross, there is present a deposit of lymph, plasma, or plastic matter. When occurring upon the free surfaces of the organs, it usually presents itself in the form of a layer, which, escaping the influence of the absorbents, is ultimately converted into an analogous tissue that often remains during the rest of the individual's life, being subject in the meantime to all the diseases and accidents incident to the pre-existing structures. When the deposit takes place in the substance of the organs, it fills up their cells, interstices, or molecular spaces, and thus increases their consistence as well as their weight, the matter assuming the shape of the cavities in which it is lodged, and being liable, as in the former case, either to be absorbed or to become organized, according to the condition of the part and the vitality of the morbid product. This arrangement occurs when plasma is effused into the cellular tissue beneath the skin, among the muscles, and in other localities. It is an exceedingly common process, and may take place in any organ or tissue of the body. It is more frequently met with, however, in the lungs, liver, thyroid gland, the mamma, ovaries, uterus, bones, and submucous cellular structure. The period of life in which this derangement may occur exerts no little influence upon its production. In the large majority of instances it takes place during the earlier years—in others it occurs later in life; as for example, the thyroid gland rarely becomes affected before the fourteenth year, while in the genital organs it is seldom or ever seen until after puberty. Induration of the prostate gland, of the vascular system, of the brain and spinal cord, and of the crystalline lens and its capsule, is emphatically a disease of advanced life.

Pathology.—The degree of induration varies from the slightest alteration of the natural consistence of the part to the solidity and density of concrete albumen, old cheese, fibro-cartilage, cartilage, and bone. This depends, however, in a great manner, upon the nature of the affected tissue and the date of the lesion, or the degree of change the deposit, upon which the induration hinges, may

have undergone. The color of the affected part may be normal or variously changed, according to the amount of its vascularity and the presence or absence of effused blood. Diversity of opinion exists in regard to its volume; although in most cases this is considerably augmented, sometimes even to an enormous degree, several times the bulk of the normal structure. The weight of the part is also increased; this condition being associated with more or less desiccation of the organ, with a marked loss of elasticity. The period required for its production ranges from a few hours to several days, weeks, or months, depending upon the nature of the exciting cause and of the affected structures. In the *testicle* it takes place rapidly, frequently reaching its height of induration within forty-eight or sixty hours; in *tonsillitis*, *adenitis*, *furunculus*, *carbuncle*, and *erysipelas*, it may attain its greatest maximum in even less time than the preceding. In inflammations of the *joints*, especially those of a gouty or rheumatic character, attacking the contiguous cellular tissue, it increases with marked celerity. In pneumonia, the parenchymatous structure of the lungs may be, under advantageous circumstances, often intensely solidified within two or three days from the beginning of the attack. More frequently, however, it proceeds slowly, and requires a much longer period to effect induration of its substance.

The effect of this hardening process upon the tissues is of the most prejudicial character, seriously impairing the structure and functions of the part, and often leading to the most melancholy results. Thus, when it affects both *testicles*, it often leads to impotence; in the *liver*, it may so derange the secretion of bile as to lead to the worst consequences; and in the *lungs*, death may take place from occlusion of the air passages. In the *arteries*, induration is frequently the cause of aneurism, by rupturing their coats and permitting the escape of their contents; while in the cellular tissues around the joints, it always impairs the free movement of the articular surfaces.

The immediate cause of induration is a deposit of plastic matter into the cells of the affected structures, which it thus obliterates while it condenses the adjoining tissues, and thus renders it unfit, either temporarily or permanently, for the proper exercise of its functions. This fluid has intermingled with it a greater or less quantity of serum — and sometimes pus, and not unfrequently pure

blood. When the circumstances under which it is deposited are favorable, it soon becomes organized, and may ultimately be converted into an analogous tissue, which often retains its parasitic connection during the remainder of life. In certain cases and under favorable conditions it may entirely disappear, leaving no trace of its existence.

Treatment.—The treatment of this affection will be governed entirely by the pathological lesions it engenders, our chief object being to select those remedies that act specifically on the structures affected, in order that the deposit may be absorbed into and carried off through the capillary circulation. In all cases the treatment should be begun as soon as possible, procrastination not only adding to the structural change, but diminishing the chances of success. The longer we wait, says a recent surgical writer, the greater will be the danger of a permanent change of structure, or, when the organ is one of great importance to life, of the death of the patient. The chief reliance of allopathy, where the deposit is recent and action still high, is upon the vigorous employment of antiphlogistics, such as bleeding, purging, and diaphoretics, with antimonials, light diet, and perfect rest in the recumbent posture. After moderating inflammation by this means, they depend upon alterative doses of mercury, stimulating lotions, liniments, embrocations, and unguents. In the chronic varieties, dependence is placed upon the internal administration of iodine and its preparations, mercurial alteratives, with topical applications, friction, and the cold douche.

The **Homœopathic Treatment** consists in selecting those remedies that act specifically upon the organs affected; and if these are given according to their indications, and with a proper regard to the potency in each case, little apprehension need be feared of success in the treatment in all curable cases. I shall content myself with recommending those remedies which, from the totality of their symptoms, cover the disease as it appears in the different organs of the body.

Induration of submaxillary glands is best met by aconite, mercurius jodatus, iodine, belladonna, kali hydriod, carbo animal, conium, arsenic, baryta muriaticum, calc. carb., sulphur.

Induration of liver—By bryonia, arsenic, podophyllum, mercurius, iodine, belladonna, apis, conium, and sulphur.

Induration of tongue—Aconite, belladonna, mercurius, arsenic, baryta muriaticum, kali hydriod, iodine, and sulphur.

Induration of neck of uterus—Belladonna, pulsatilla, cantharis, helonin, caulophyllum, and macrotin.

Induration of tonsils—Mercurius, iodine, kali bichromas, belladonna, kali hydriod, ranunculus bulbosus, aconite, apis mellifica, and mercurius.

Induration of salivary glands—Aconite, belladonna, mercurius, and kali hydriod.

Chronic glandular indurations—Belladonna, phosphorus, conium, mercurius, iodine, sulphur, rhus tox., thuya, kali hydriod, carbo animal, silicia, aurum, calc. phosph., oleum jecoris, and baryta muriaticum.

These are the principal remedies, and should be selected with especial reference to the indications in each case. In addition to the constitutional treatment, much benefit will be derived from *topical applications*, *sea-bathing* (or, where this can not be obtained, *salt-water baths*), *friction*, the *cold douche*; and above all, equable and well-adjusted pressure by bandages. Care should be taken in such cases that the patient be as quiet as possible during treatment; and rest in the recumbent position, whenever practicable, should be rigidly enforced. Medicated lotions of the appropriate remedy, applied locally several times a day, or even continuously, will be found of great efficacy in the conduct of the case.

SECTION III.

HYPERTROPHY.

The term *hypertrophy* is used to designate the increased size and weight which an organ acquires in consequence of an augmentation of its nutrition, or the deposit of plastic, organizable matter in its interstices. It may be both *general* and *local*; and the latter may either occupy an entire organ or be limited to particular portions of it, or even to some of its component elements. It may exist alone or in association with other lesions, and is liable to occur at all periods of life—sometimes (as in the thymus gland and capillary vessels) apparently even before birth. No organ or structure is

probably entirely free from it; but among those which are most frequently affected may be specified the lymphatic ganglions, the mammæ, thyroid gland, spleen, heart, prostate gland, tonsils, bones, vessels, adipose tissue, and skin. The best example of hypertrophy of the cutaneous textures is elephantiasis, in which the increase of weight and bulk is sometimes enormous.

Causes of Hypertrophy.—The most marked instances of hypertrophy occur from perverted nutrition, which has often a low or chronic inflammatory type. Such are the indolent tumors of glands, the thickening and induration of areolar tissue, the enlargement of bones under chronic processes of disease. Hypertrophy also occurs from exalted functional activity, as in the highly-wrought muscles of the blacksmith's arm; or in one kidney, when the opposite has been lost by structural change. Again, hypertrophy, chiefly of the fatty tissue, may take place from over-assimilation, with deficient exercise; the effects of this cause upon the organs of motion, however, being quite of an opposite kind. Perversion of nutrition of the most varied character leads to hypertrophy of particular organs.

Hypertrophy may be also caused by *mechanical impediment* interfering with the due performance of the functions of an organ. This is exemplified in enlargement of the heart, when the proper circulation is interfered with in consequence of valvular disease of that organ—the heart being compelled to undergo increased action, thereby increasing in volume. When obstruction occurs at the pyloric orifice, and in the urethra from stricture of the canal, the same thing may be observed in reference to the fibers of the stomach and bladder.

Hypertrophy from *chronic irritation* is also met with under a great variety of circumstances. This species of hypertrophy is often seen in those cases where induration of a lymphatic ganglion of the groin is dependent upon a chronic or sub-acute irritation of the head of the penis; in enlargement of the mesenteric glands, from ulceration of the ilium; and of the bronchia, from disease of the lungs. Enlargement of the liver and spleen, which sometimes attain an enormous size, is due to a similar condition of things. In chronic dysentery, also, the mucous and submucous cellular textures become hypertrophied, the disease extending to the muscular tunic, which occasionally attains an extraordinary

degree of development. The follicles and villosities, which in the healthy state are hardly perceptible to the naked eye, become so prominent as to be plainly visible.

Encysted tumors of the skin, mucous membranes, ovaries, and some other parts of the body, are evidently mere enlargements of the glands, cysts, and cells, which naturally exist in these structures, in consequence of chronic irritation or inflammation. Thus, in the skin follicle, the first step in the development of the morbid growth is an obstruction of its orifice, thereby interfering with the evacuation of its natural secretion. This being retained, becomes altered in its properties, at the same time that it presses everywhere upon its sides. Thus, two sources of irritation are set up—altered and retained secretion, and constant pressure—under the combined influence of which the little follicle often expands into a tumor of considerable size. Ovarian tumors, which are so frequently seen in elderly females, are produced by the same cause.

The *color* of the affected organ varies much in different cases and under different circumstances. It is usually lightened in appearance when the hypertrophy depends upon physiological causes alone; but instances are sometimes met with where the color of the tissues are natural in appearance. An increase of weight of the affected organ follows as a necessary consequence in all cases where the lesion is not conjoined with atrophy. An augmentation of volume is by no means constant. Thus, in hypertrophy of the heart and bladder there may be great development of the muscular fibers, with marked diminution of the size of their cavities. A change of form always arises when the hypertrophy is partially circumscribed or limited to a particular point, as in the bones, skin, heart, bronchial tubes, and blood-vessels.

Pathology.—Hypertrophy essentially consists, as I have attempted to show, in an augmentation of the nutritive function of an organ. When in a state of unusual activity, the quantity of blood which an organ receives is considerably increased, in consequence of which it assumes a deeper color than one which is less exercised, at the same time that it augments somewhat in density; its elementary particles are increased in number, or such as already exist are augmented in size. This is the manner in which alteration in structure is brought about. In that variety which results from chronic irritation there seems to be superadded to the alteration just mentioned a deposit

of new substance in the interstices of the connecting cellular tissue, leading thus to a real change of structure.

Treatment.—The treatment of hypertrophy is conducted upon the same general principles that govern induration, and the remedies adapted to the cure of the latter will prove serviceable in the conduct of the former. In each case recourse should be had to the *materia medica*; and by comparison and analyzation there need be no difficulty in selecting the proper and appropriate remedy in all cases that fall under the observation of the practitioner.

The use of sorbefacients, locally and constitutionally applied, according to *allopathic* authority, is often of little or no benefit in the cure of this derangement. The means employed have been iodine, blisters, compression, mercury, iodide of potassium, and tartrate of antimony and potassa, aided by purgatives and attention to diet.

In those cases that do not yield to medicinal impressions, and where, from its unsightliness, inconvenience, or deformity, the removal of the affection is demanded, the only alternative is excision.

SECTION IV.

ATROPHY.

This disease is the reverse of the one just considered, and consists of a wasting of the substance of an organ, with a diminution of its weight and bulk, generally accompanied by more or less degeneration of the structure of parts. It sometimes takes place as a congenital affection, but more frequently is the result of disease; curable or otherwise, in proportion to its extent, the length of time it has existed, and the nature and extent of the exciting causes.

Causes of Atrophy.—The causes giving rise to this disease are various, and may be referred to whatever diminishes the quantity or quality of the nutritive material furnished to a part by the blood or the forces by which in the healthy state it should be appropriated. Among these may be mentioned, *first*, cessation of the natural function of an organ; *second*, loss of nervous influence; *third*, deficient supply of blood or nutritive matter; and *fourth*, inflammatory irritation.

In atrophy, therefore, there is recognized a failure to a greater or less extent of the normal cell action of the part affected, which may be dependent upon an absence of proper cell irritability, or to a deficient supply of blood. In the latter case the pressure of tumors, aneurisms, etc., upon the vessels of a part, by cutting off the vascular supply, is a frequent cause of this species of degeneration. *Paralysis, or deficient nerve force*, also exercises a marked influence on local nutrition; and hence, parts paralyzed become more or less atrophied, as is frequently observed in the extremities, or more rarely in single muscles, where a blow or fall upon the part occasions more or less irritation of the muscular nerves. Alterations in the quality of the nutritive materials frequently lead to degeneration and atrophy of structures, as is often witnessed in the general emaciation, accompanied by fatty degeneration of the heart, liver, spleen, and other organs, in the latter stages of the anemia of cancer or tuberculosis.

Fatty Degeneration is the most common form of this affection, and has been more thoroughly investigated than any other cause. It consists essentially in the more or less complete transformation into oil of the proximate principles of which the involved organic cells are composed, as may be shown, in a general way, by the unnatural oleaginous properties of the structure affected; also, by its tawny or yellowish color, and by the excessive quantities of ether extract which it yields. Viewed by the microscope, innumerable oil globules of variable size are seen intermingling with the fluid contents of the cells—in their walls, in the fibrinous and membranous tissues, and in the fluid plasma lying between the cells. The textures thus affected become preternaturally soft, their functions are imperfectly performed, and they may be ultimately transformed into a soft, pulpy, or fluid mass, as occasionally happens in cartilaginous degenerations, and especially in those formations known as cancer, or tubercle.

Calcareous Degeneration.—This abnormal condition manifests itself by the preternatural presence in the affected texture of various earthy salts, especially the phosphate and carbonate of lime. It may be sometimes associated with fatty degeneration, as occurs in atheromatous disease of the arteries, producing ossification of those vessels.

Horny Degeneration.—This manifestation of the atrophied con-

dition consists of a withering or obsolescence of the tissues, which become dry and shriveled in consequence of the loss of the natural juices or succulence of the structures affected. It is a law of the animal economy that whenever an organ ceases to be of further use, it falls into a state of decay. This is exemplified in the case of the umbilical vesicle of the foetus, which, having subserved the purposes of its formation, shrinks and withers away. The gubernaculum is a thin, membranous process, and forms about the tenth week of foetal life, and whose office is to direct the testicle to the external ring; after which it is converted into cellular substance. The alveolar processes of the jaws are also typical of this degeneration, and disappear after the removal of the teeth. There are instances where atrophy takes place either during foetal life or soon after. A *deficient supply of blood* is another cause of atrophy, as may be seen in the wasting away of the testicle after ligation of the spermatic artery, and the shrinking away of the muscles of an extremity after tying the principal arterial trunk. Atrophy may occur from mere want of exercise, as in the wasted and attenuated legs of a person with club-foot—the muscles of the limb being deprived of their natural nervous and vascular functions. Atrophied structures are prone to undergo fatty degeneration, which acts as an exciting cause of the wasting process, as before remarked under the head of Fatty Degeneration. These two lesions sometimes are so intimately associated that it is almost impossible for the practitioner to determine which preceded the other, or what part they played as cause and effect.

Treatment.—The treatment of atrophy, when it occurs in an external portion of the body, as in a muscle, is best conducted by the employment of cold or warm douches, friction, the application of magnets, galvanism, and especial attention to the general health of the individual. The affected part should be exercised gradually and persistently from day to day—re-educating it, as it were, to the accomplishment of its normal functions. There is no question but the influence of a strong will has been oftentimes serviceable in rousing the latent stimulus of a part, and leading it anew to the proper performance of its wonted action. Many cases of this kind are recorded, where the palsied limb has regained its normal faculties, the patient throwing away his crutches and walking off under the invigorating influence of this nervous

power. The remedies serviceable in counteracting this degeneration and restoring the parts again to their normality are: ars., puls., argenti nit., ant. crud., bry., rhus, and sulph., which may be employed according to their several indications—selecting the remedy, in all cases, the most appropriate to meet the totality of symptoms displayed. The “movement cure”* of Dr. C. F. Taylor has been productive of much real benefit in the treatment of this affection—to which the student is referred for valuable information in the conduct of this derangement.

CHAPTER VIII.

EFFECTS OF HEAT AND COLD.

SECTION I.

BURNS AND SCALDS—AMBUSTIONES.

Burns are the result of the application of a degree of heat higher than is compatible with the healthy action of the part affected. They are produced by actual contact with heated substances or by radiation, the severity of the injury sustained depending upon the intensity of the heat and the length of time the part is exposed. In the milder forms there is simply increased vascular action, with slight superficial inflammation; whereas, in a more marked degree the nutritive action becomes greatly impaired, resulting in a more or less complete destruction of the tissues. Heated solids generally produce a more serious injury than heated liquids, as the latter usually spread rapidly over the surface; provided, however, such liquids as molten lead or iron, or viscid substances as oil, are for a moment retained in contact with the part, as great destruction will often result as though fire itself had been applied.

* “The Movement Cure,” by Dr. Chas. F. Taylor. See articles published in North American Journal of Homœopathy, vol. viii, et sequitur.

Scalds are a class of injuries occasioned by the application of some heated fluid, differing somewhat in the appearances produced.

Classification.—The most simple classification of burns includes three varieties :

1. Those producing increased vascularity and slight inflammation of the integuments, unattended by vesication, and having a tendency to terminate readily in resolution.

2. The vesicular variety, in which the cuticle is raised into blisters, and frequently terminating in ulceration.

3. Those which are sufficiently severe to cause absolute death of the part.

This classification is quite elaborate for all practical purposes, as these varieties will often be found so intimately associated that an accurate division is wholly impossible. The most scientific classification, however, that has ever been offered, is that proposed by the distinguished Dupuytren, who arranged them into six varieties, and which, for the purpose of study, will prove highly serviceable to the student. It is as follows :

1. Burns creating a simple erythema, without the exudation of serum or the formation of vesicles.

2. Those accompanied by inflammation of the skin, with detachment of the cuticle by vesication.

3. Burns producing destruction of the dermis, or true skin.

4. Those converting not only the skin but a portion of the subcutaneous areolar tissue into an eschar.

5. Those in which the eschars implicate the muscles, faciae, and other soft structures.

6. Those in which the entire structure of the part is destroyed.

Local Effects.—The primary local effect of a burn is to excite inflammation of the part; or, if more severe, to destroy the vitality of more or less of the soft structures, and even the bones. When the cuticle is unbroken, the inflammatory action speedily subsides, with more or less desquamation. Provided the soft parts become charred, they are detached by a process of ulceration analogous to the separation of sloughs, and an ulcerated and suppurating surface is left, remarkable for the large size, florid color, great vascularity, and rapid growth of its granulations. The cicatrix that results is unusually thin, of a bluish-red color, and is especially characterized by a great disposition to contract—becoming, event-

ually, contracted and much indurated. This process of contraction and hardening, which supervenes immediately upon the completion of cicatrization, continues for many months, frequently giving rise to the most serious deformities, and occasionally to the complete loss of motion in the parts.

Constitutional Effects.—These are of the most dangerous character, being dependent, *first*, upon the situation of the burn; *second*, the extent of surface implicated, rather than the depth of the injury; and *third*, the age of the patient.

Burns about the trunk, head, and face, are far more liable to be attended by serious constitutional disturbance than similar injuries of the extremities. In children and very old persons, the system suffers more severely than in those of middle age.

The constitutional disturbance induced by burns may be divided into three stages: 1. The period of nervous depression and congestion. 2. That of reaction and inflammation. 3. The stage of suppuration and exhaustion.

1. During the **period of depression and congestion**, which usually occupies the first forty-eight hours, the danger is imminent, and death may occur before it is possible for any inflammatory action to be set up. Immediately on the receipt of a severe burn, the patient becomes cold, collapsed, and is seized with fits of shivering, which continue for a considerable time. The severity of the shivering is indicative of the extent of constitutional disturbance induced by the burn, and is more prolonged in those injuries that occupy a great extent of surface than in those which are deeper though implicating less surface. On the subsidence of the symptoms of shock, there is usually a period of quiescence before reaction comes on; and during this period the patient, especially if a child, dies comatose—death resulting from congestion of the brain and its membranes, with serous effusion into the ventricles or the arachnoid. Besides these lesions, the mucous membrane of the stomach and intestines, as well as the substance of the lungs, are usually found congested.

2. The **period of reaction and inflammation** extends from the second day to the second week. *Irritative fever* sets in early, with a degree of severity proportionate to the previous depression; and as this stage advances, special symptoms commonly occur, dependent upon inflammatory affections, more especially of the

abdominal and thoracic viscera. Death, which is more frequent in this stage than in the preceding one, is generally connected with some inflammatory condition of the gastro-intestinal mucous membrane, or of the peritoneum. The lungs also are frequently affected, giving marked evidence of pneumonia or bronchitis; the cerebral lesions are not so common as in the first stage. It is in this stage of burn that a very remarkable and serious sequela—perforating ulcer of the duodenum—is especially apt to occur. This ulceration, proceeding rapidly to perforation, exposes the pancreas, opens the branches of the hepatic artery, or, by making a communication with the serous cavity of the abdomen, produces peritonitis. It usually comes on about the tenth day after injury. These affections seldom occasion any very marked symptoms to indicate the nature of the mischief, save there is rapid sinking of the patient; in some instances there is hemorrhage, though this may occur from the intestinal mucous membrane; pain in the right hypochondriac region, and perhaps vomiting, may also be present.

3. The period of suppuration and exhaustion continues from the second week to the close of the case. There are frequently symptoms of hectic, with much constitutional irritation from the long continuance of exhausting discharges. If death occur, it is most frequently induced by inflammation of the lungs or pleura; affections of the abdominal organs and brain being rare during this stage of the injury.

Diagnosis.—It may sometimes become a matter of importance, in a legal point of view, to determine whether the injury be a *scald* or a *burn*. As a general rule it may be observed that, as burns are usually occasioned by the part being brought into actual contact with a heated solid or a flame, they are not so extensive, though of greater depth, than scalds. A more reliable rule, however, to apply in doubtful cases, is to observe whether the hair upon the part be singed; if so, it may be regarded as very conclusive evidence of a burn, as in scalds the hair always remains.

Prognosis.—This has, perhaps, been sufficiently well indicated in what has already been stated respecting extent, degree, and situation; though by way of a special prognosis the observation of Dupuytren may be added, in which he states that a burn of the first or second class covering *one-half* of the body will be likely to prove fatal; that one of the third class occupying *one-fourth* of

the body will probably terminate in the same manner; while the fourth, fifth, and sixth classes will be apt to produce death if only *one square foot* of the body be affected.

Treatment.—The treatment of burns in their early stage has been a question of dispute between surgeons. While some have advocated the use of ice and cooling applications, others, with more propriety, have recommended stimulants, and especially the use of turpentine; which latter plan received the sanction and approval of Mr. Kentish, of Newcastle, at the beginning of the present century. No class of injuries has been so much the subject of empirical treatment as burns; and yet the indications for treatment, if viewed according to the principle of “*similia*,” are as simple and intelligible as any other affection. The treatment of burns varies with the extent of the injury. In superficial burns, where there is simply redness and the ordinary signs of commencing inflammation, the indication is first to prevent the threatened inflammation or limit its extension, relieve pain, and, as soon as possible, restore the parts to their natural condition. The remedies, therefore, will be both local and constitutional. Burns of the first degree seldom require more than the following local applications, which have been found the most appropriate, as they fulfill most of the indications of homœopathic therapeutics, viz: *Arnica*, *cantharides*, *urtica urens*, and *rhhus radicans*. Mix one dram of the remedy with half a pint of warm water, and apply as hot as the patient can bear it, preserving the temperature by frequent applications of the liquid. Professor R. Ludlam* recommends as an external application a mixture of tinct. *urtica urens* and olive oil—one part of the first to eight parts of the latter, applied by means of pledgets of soft linen soaked in the preparation and laid directly upon the inflamed surface. Cleg-horn, † a brewer of Edinburgh, say Marcy and Hunt, prizes highly the application of acetum, or vinegar, to burnt surfaces, continuing it till the pain abates; the eschars to be covered with poultices and afterward sprinkled with finely-pulverized chalk. *Creosote water* ‡ has likewise been recommended as a lotion in all kinds of burns, either at the commencement or subsequently, to induce granulation and cicatrization. After vitality has been partially restored and the

* North American Journal of Homœopathy, vol. x.

† Marcy and Hunt's Theory and Practice—article, Burns.

‡ Laurie's Homœopathic Practice of Physic, p. 533.

tendency to inflammatory reaction diminished, apply "carron oil," which consists of equal parts of lime-water and linseed oil; or coat the parts with flour, shaken from an ordinary dredging-box, until they are *completely* and *thickly* covered.

In slight burns or scalds, the popular practice of holding the part close to a hot fire for two or three minutes is often of great service. Another application of undoubted efficacy is raw and uncarded cotton, covering the part with thick layers, which serve the double purpose of protecting it from the atmosphere and exercising a specific effect upon the disease. When suppuration sets in, remove the upper and substitute a fresh layer; at the same time administer hepar sulph., calc. carb., or silicia, internally. When the discharge is excessive, and the system is much prostrated, give china or calcarea c.; warm spirits have been highly praised, and a mixture of rum and molasses (a Southern specific) has been used by Prof. Hill with admirable results.* He says: "The spirits and molasses should be intimately mixed and applied cool, either by wetting an elm poultice with the mixture or saturating a piece of raw cotton or canton flannel, and applied to the part; then covering all with some wet article, impervious to air, such as a solution of gum arabic." Dr. Blair, of Cleveland, Ohio, has been in the habit of prescribing pure molasses for a long time as a specific for all kinds of burns, with the happiest results. He applies it so as completely to cover the affected part, and keeping it thus by renewing the dressings with the molasses until all inflammatory action has ceased. The great principle in the treatment of all burns is to *keep the surface entirely shielded from the atmosphere*. Another application highly spoken of is the use of soap. Dr. Tift, of Norwalk, Ohio, uses this preparation in the following manner: He makes a stiff lather with shaving-soap, which he applies again and again until a *thick* coating covers all the injured part; over this he applies thin linen strips spread with a thick layer of soap. The application of the soap-dressing at first rather increases the pain, on account of its stimulating qualities, but soon mitigates it, and is said to prevent suppuration and those hideous scars that often follow extensive or deep-seated burns. Carbonate of lead (white lead), rubbed up with linseed oil, has been highly

* Hill and Hunt's Surgery—Burns and Scalds, p. 103.

recommended by Dr. Barry, of England, and by Professor Gross, of Philadelphia; the preparation being spread thinly over the surface, so as to give it a complete coat of paint. If the burn is of a very limited extent, the surface may sometimes be advantageously painted with collodion, or the ethereal solution of gun-cotton. This is at first painful, from the stimulus of the ether which the preparation contains; but as the latter soon evaporates, the collodion shields the parts from contact with the atmosphere, produces contraction of the tissues, and thus promotes the healing of the ulcer while obviating external sources of irritation. Liquid caoutchouc has also been highly extolled by Prof. Silliman, of New York. This is the liquid or milk of the hevea or caoutchouc, as it exudes from the tree. It is preserved in this state by the addition of a small quantity of free ammonia, and is of the color and consistence of pure milk, but becomes transparent on exposure to the air. Owing to its great elasticity, it does not contract as violently as the collodion, but adheres closely to the skin, and allows entire freedom of motion and application to any extent. In burns, Prof. Silliman thinks it possesses advantages over anything he has ever used. During the *suppurative* stage that occurs after these injuries, there is no remedy at present known that acts more promptly and beneficially than calendula. It may be used in the form of lotion or cerate, by mixing proportionate quantities of the remedy with water or lard, and continually applying to the part. A large experience with this remedy in suppurations, from whatever cause, has given me the most unbounded confidence in its efficacy, as being the most valuable drug for suppurating surfaces yet known in the materia medica. In superficial burns, resulting from the accidental explosion of gunpowder, grains of powder unconsumed are often buried in the skin, subsequently leaving blue points, which create deformity. To remove these, Busch recommends the application to the part of a solution of corrosive sublimate (five grains to the ounce of water), so as to create an eczematous eruption: the vesicles containing the grains of powder will fall off with the dried scales resulting from the vesicles. The constitutional disturbances that result from burns may be treated by arnica, aconite, carbo veg., coffea, causticum, hepar sulph., arsenicum, lachesis, rhus tox., and secale cor.

Arnica is serviceable, in all cases and ages, to allay the extreme

sensibility of the system, the general restlessness, irritability, and intense pain in the seat of injury.

Aconite is invaluable in the subsequent excitement that follows burns, when the inflammation is extensive, with considerable fever, or when the system has received a severe shock from fright at the time of the injury.

Carbo veg. is peculiarly adapted to those extreme cases in which the pain is so excessive as to threaten extinction of the vital powers.

Coffea is useful in quieting the nervous irritability of the body, to promote sleep and allay excitement.

China and *hepar sulph.* in those burns where suppuration has taken place, and the discharge is so copious as to threaten impairment of the constitution. If the nervous system is much affected, with more or less fever accompanying, give belladonna or hyoscyamus, either alone or in alternation with aconite. In convulsions from burns in young children or delicate females, chamomilla has been advocated as beneficial. In the more severe forms of burns, where there is a disposition to sloughing, to promote healthy granulation and cicatrization, either arsenic, nitric acid, lachesis, rhus toxicodendron, or secale may be administered, according to their respective indications.

Fig. 138.

The *cicatrix* from burns is often a source of serious difficulty, as it has a greater tendency to contract than any other cicatrix or inodular tissue resulting from injury. So marked is this tendency in some cases that the motion of limbs is lost, and surrounding parts are drawn out of their line, so as to create great and striking deformities, as in Fig.



138. The relief afforded by the division of any of these cicatrices is exceedingly doubtful; and as a general rule it may be laid down

that it is useless to cut through any adhesions that result from burns unless a plastic operation is also performed in order to replace the tissue that has been destroyed.

In some instances, no matter how judicious the treatment, this unfortunate result will sometimes occur, and task the utmost ingenuity of the surgeon to prevent it. It is a natural consequence of the contractive force of the inodular or cicatrizing tissue, and can only be relieved by resort to the knife. In order to prevent deformity, the process of cicatrization must be carefully watched, and so regulated that "*the cicatrix may have the same extent of surface as the original skin that has been destroyed.*" This may be effected, first, by the administration of appropriate remedies when the granulations are unhealthy; second, by the proper position of the injured part; third, by the method of dressing the wound; fourth, by the adaptation of proper mechanical apparatus; and fifth, by specific dynamic agents internally administered." Sometimes the cicatrix presents such a low degree of vitality that ulceration is constantly taking place in it. In burns situated near orifices, such as the mouth, eyes, nostrils, anus, and vagina, great care and watchfulness should be enjoined upon the medical attendant during the healing process, as it is particularly desirable that the patulous condition of these parts should be preserved. The *sudden* extension of the fingers when they have been long bent, from contraction of the cicatrized integument after a burn, is frequently followed by gangrene. The extension, therefore, should be gradual and slow, and we should avoid dividing or excising the bridle caused by the contracted cicatrix. When the process of cicatrization is accompanied by excessive inflammatory action of the surrounding edges, administer arsenic, hepar, nitric acid, phosphorus, ruta, or silicia, according to the indications in each case. When the granulations are luxuriant or excessive, give alum, creosote, nit. argenti, plumbum, sepia, and thuya, and apply a solution of these remedies externally. When cicatrization is interrupted by excessive suppuration, the most appropriate remedies are asafœtida, calendula, causticum, pulsatilla, hepar, rhus, and silicia. When the ulcerated surface bleeds upon the slightest touch, crigeron, hamamelis, crocus, phosphoric acid, secale cornutum, arsenic, belladonna, and sulphur.

In the operation to be performed for the relief of these cicatriza-

tions following burns or scalds, Dupuytren laid down three rules of practical value to the surgeon :

1. The surgeon should not attempt to remedy the deformity until many months, or even years, have elapsed since their production.
2. Never to operate unless certain of obtaining a larger cicatrix than that which it is intended to correct.
3. To be certain that the operation can restore the parts to their shape ; consequently, in cases of ankylosis of a joint, the operation would be improper.

In relation to the different modes of operating, he has given directions of great value, viz :

1. In a long, narrow cicatrix, he recommends several incisions, so as to divide the cicatrix transversely through its entire thickness, without removing any part of it, in order to facilitate its stretching.

2. To stretch the parts and bring them into a direction different from that which the contraction had caused, in order to obtain a cicatrix by the production of new skin. This extension must be made with caution and judgment, lest violent pain, inflammation, and gangrene result.

When a limb is charred throughout its entire thickness, the best means of proceeding is by amputation, as soon as the system has sufficiently rallied from the violence of the shock. When a joint has been opened into, or a bone necrosed, or when from any other cause the suppuration is profuse, the healing slow, with accompanying hectic, it may be necessary to amputate secondarily to save the life of the patient. If the constitution of the patient is good, the system not having been broken down by pernicious influences, a successful issue generally will be the result. Throughout the treatment of the case, and especially during the inflammatory stage, *great regard should be paid to the condition of the internal organs, especially the lungs.* Let it be borne in mind that the patient is not free from danger until complete cicatrization has taken place.

The practice of purgation advocated by some allopathic surgeons (to keep open the secretions) is much to be deprecated, as when strong purgatives are used a most troublesome diarrhœa often ensues, giving rise to much inconvenience, and oftentimes to great depression of the vital forces.

The *diet* to be employed in cases of burns should be light, unstimulating, and nutritious. When there is much purulent discharge, the patient should be supported with a *milk diet*, the utility of which practice has been attested by surgeons in the cure of the most extensive burns ever published in the annals of surgery. This was the practice employed in the United States General Hospital at Mound City, near Cairo, Ill., for those terribly-scalded sailors from the various gunboats engaged on the Western waters during the rebellion; and the results from such treatment were gratifying in the extreme. Of the whole number treated, amounting to over fifty, not a single death occurred, and no deformity to any extent existed save in one case, where vision was entirely lost; see Fig. 139. The accompanying cut, from my private collection, represents a very severe burn or scald, which occurred on board one of the Western gunboats during the late civil war. The patient, a

Fig. 139.



sailor attached to the gunboat "Mound City," was scalded on that ill-fated vessel, June 17, 1862, caused by a solid shot being driven through her steam-chest. At the moment of the accident, he, with others, was engaged in shifting the port gun to the starboard bow, when they were enveloped in the escaping steam. His face, neck, arms, and legs, were terribly scalded. After receiving this injury, he jumped into the water, swam ashore, and walked nearly a mile, retaining his sight sufficiently to enable him to see his way. After

sleeping from excessive exhaustion, he awoke with complete loss of vision. He entered hospital about one week subsequently, with an enormous suppurative surface, fever and nervous prostration accompanying. He was treated locally with the flour-dressings, internally with *hepar sulph.* and *aconite*, and put upon a generous milk diet. He recovered entirely the use of his limbs, with scarcely any mutilation or disfigurement. Complete disorganization of the eyes ensued, and he was removed to the "Seamen's Retreat," Staten Island, where he still remains, possessing entire freedom of motion in every part of the body except the lower palpebræ.

SECTION II.

EFFECTS OF COLD.

The effects of cold are both constitutional and local. In the constitutional symptoms accompanying exposure to intense or long-protracted cold, there occurs an almost irresistible desire to sleep, consequent on congestion of the brain, and which, if yielded to, terminates in coma and death. Tetanic spasms are also exhibited in some instances, as is recorded in the case of some who were exposed to polar cold in the expedition of Dr. Kane. In the comatose state the surface is pale and cold; the pulse feeble, perhaps entirely lost at the wrist; respiration almost imperceptible; and the pupils dilated. It should be recollected, however, that in the constitutional as well as in the local effects of cold, patients suffer more, as a rule, from alternations of temperature, from cold and moisture, than from a low degree of cold steadily maintained in a dry atmosphere.

At the siege of Corinth, in the winter of 1862, it was observed that comparatively few of the soldiers at the front suffered from frost-bite—notwithstanding the weather was cold, with the thermometer several degrees below the freezing-point—owing to the circumstance that bivouac fires were prohibited in consequence of their close proximity to the enemy. At more remote parts of the lines, where fires were allowed, the men suffered severely from frost-bite. Baron Larrey states that, in the campaign of Napoleon in Poland, the troops would march without serious inconvenience even when exposed to a temperature of 15° below zero, but when coming near a camp-fire were likely to suffer directly from severe frost-bite, losing fingers, toes, and even limbs. He relates the case of a soldier who, after exposure to cold, went into a warm guard-room and immediately fell down asphyxiated, and died.

The local effects of cold may be treated of under two distinct heads, differing only in degree: 1. *Pernio*, or *Chilblain*; and 2. *Frost-bite*.

1. *Pernio*, or *Chilblain*, is a term applied to a superficial inflammation, usually occasioned by sudden alterations of temperature, especially when the part is damp. This affection varies greatly in its severity; in some instances giving evidence of only slight

inflammatory action, in other cases accompanied by the formation of vesicles, which may pass on to ulceration. It is most frequent in women and children and in persons of impaired health, and is usually the *secondary* effect of cold; the reaction following the antecedent depression is in excess, yet accompanied with diminished power of control. Either a congestive or chronic inflammatory process may be established; nevertheless, a high degree of over-excitement does not take place, otherwise gangrene would inevitably ensue and the case be termed one of frost-bite.

Symptoms.—The phenomena of chilblain may present themselves in three degrees, according to the severity and extent of the exposure, the susceptibility of the person exposed, and the constitutional vigor to resist external impressions. In the *first* degree, or milder type of *pernio*, the skin is red in patches and slightly swollen, accompanied with an unpleasant sensation of *heat*, attended or followed by an intolerable itching. The part is swollen, and presents a dark-red appearance; and may remain in this condition for a long period, neither being aggravated to any great extent nor yet disposed to get well. In the *second* degree, *vesications* appear, which contain a serous liquid, the skin adjacent being purple or bluish. These vesicles sometimes burst and disclose beneath an ill-conditioned ulcer, discharging a thin, serous fluid; or, instead of vesication, the sores crack and gap open, degenerating into the *third* degree of ulceration, or sloughing. Usually, however, the ulceration is only superficial; rarely, it extends deeper, involving the subjacent structures of the part, attacking the bones and tendons lying beneath, and terminating in disease of the bones, or gangrene of the softer structures.

The most frequent form of this affection—that unattended with ulceration—is often met with in this climate during the winter season. In the first place, there is a burning, tingling, or benumbing sensation when the extremities, after exposure to cold, are brought near a fire. The part then assumes a violet or livid color, this being intensified according to the degree of cold to which the part has been exposed; after which, reaction takes place as the result of the depression, terminating in inflammatory action—developing either disordered circulation and sensation, as in hyperæmia; or, progressing further, producing vesication and ulceration, the latter of which may show itself either

as a simple fissure of the skin, or acquire a more extended form. Chilblains often entirely disappear during the summer months, but return again in the fall and winter seasons, generally attacking those parts that have previously suffered. The affection is most liable to attack persons afflicted with dyspepsia or other diseases which render extreme circulation imperfect. Accordingly we find chilblains on the tips of the nose, ears, fingers, and toes—those parts of the body possessing the weakest vitality.

Treatment.—The remedies that have been found the most serviceable are: agaricus, cantharis, arnica, belladonna, arsenicum, camphor, nitric acid, iodine, nux vomica, petroleum, rhus tox., pulsatilla, and sulphur.

Agaricus is the first remedy to be consulted in the early stages, when the itching is extreme and accompanied by burning. It is to be applied in tincture or dilution, according to the severity of the case. It may also be given internally.

Cantharis is the remedy next in importance, fulfilling the same indications as the above, being especially applicable when there is intolerable burning, or after the formation of vesicles.

Arnica is particularly useful in those cases in which the chilblain has been aggravated by pressure or friction of the boot in walking, and when the pain is severe, or of a dull, aching character.

Belladonna may be applied when the swelling is hard, shining, painful, and of a bright-red color.

The above remedies may be used in dilution or as an unguent, by compounding one part of the tincture with four or five parts of glycerine or lard.

Arsenicum may be given internally when the surface becomes abraded, with signs of ulceration, the pain and burning being intense. It may be used in conjunction with *rhus tox.*, the latter being applied externally. When ulceration occurs, the part should be treated by applying lint well saturated with *calendula*; and in case it is very severe, a few applications of diluted nitrate of silver or *nitric acid* will be found serviceable.

The above remedies, to which especial allusion is made, are all that will ordinarily be required; the others named being employed according to the attending circumstances of each case, or in the event of the former not producing the desired effect.

Allopathic local treatment consists in using washes of spirits of

turpentine, or of the solution of the sulphate of iron or sulphate of copper, or of a solution of the nitrate of silver, of sufficient strength to create a feeling of warmth in the part.

2. **Frost-bite** is produced by exposure to a degree of cold sufficiently severe to destroy the vitality of the part. It is, therefore, accompanied by all the symptoms of high inflammatory action, with perversion of the local nutrition, as in chilblain; it chiefly implicates the extremities of the body, as the toes, fingers, chin, nose, and ears, in consequence of the circulation being less active than in parts possessing greater vitality.

Symptoms.—The first symptom of frost-bite that calls for the attention of the surgeon is a feeling of stiffness, with complete numbness of the part that has been exposed to the cold; it looks pale, has a bluish tint, and is somewhat shrunken. The vitality in this condition is not destroyed, but is merely suspended. On the return of circulation and vital action in the affected portion, a burning, tingling pain is experienced; the parts become red, and signs of inflammatory action are observed. If the degree of cold is increased, the vitality of the part is completely destroyed; sensibility and motion soon become lost; the parts assume a livid and shrunken appearance.

The degree of cold required to produce frost-bite under ordinary circumstances of exposure is considerably below the freezing-point. Mr. Guthrie* states it at ten degrees below the zero of Fahrenheit. The natives of warm climates may be severely injured by a degree of cold that would be innocuous to the inhabitants of colder regions. Thus, during the siege of Ciudad Rodrigo, when the troops were obliged to sleep on the ground without cover, three of the Portuguese actually died of cold in one night, while the British escaped entirely. Very much depends upon the *temperament*; as, according to Larrey, the phlegmatic Dutch—Hanoverians and Prussians—suffered much more severely during Napoleon's winter campaigns than the darker and more sanguine soldiers of France and Italy.† Those who indulge in spirituous liquors, exhausted as they become by constant stimulation, suffer much more than the temperate.

When the whole body is exposed to intense cold, the powers of life gradually cease; the person grows feeble and languid, inclining

* Guthrie, op. cit., p. 141.

† Larrey, Mem. de Chirurg. Mil., tome iv, p. 3.

to sleep ; and as sure as he sleeps he becomes comatose, and dies. Not only sleeping, but lying down, must be prevented, and wakefulness and physical exertion be enforced. To lie down is to sleep, and to sleep is to die. A graphic account of the effects of cold may be read in the second volume of Capt. Cook's voyages, giving a description of an exploring party in South America.

Treatment.—The treatment of frost-bite consists in endeavoring to restore the vitality of the parts frozen. In doing this, the great danger is that reaction may become so violent as to induce sloughing of the structures whose vitality has been so seriously impaired. In order to prevent this accident, recourse must be had to the most gradual elevation of temperature for restoring the vitality of the part. The frozen part should be warmed from *within outward*, and not from *without inward* by artificial warmth applied to the surface. The patient should therefore be placed in a cold room without fire, any approach to which would almost certainly induce the destruction of the frost-bitten parts. The limb should be gently rubbed with snow or cold water, and held between the hands of the person manipulating ; as reaction takes place, the parts should be enveloped in flannel or woolen cloths, and a portion of toddy or other stimulant administered. By so doing, sensibility and motion will gradually return, accompanied with a burning and stinging pain, redness and vesication of the part. If reaction becomes excessive, *aconite*, internally and externally, will be found a valuable agent. *Arsenicum* may be given advantageously, in alternation with *carbo veg.*, or alone, when the reaction is imperfect, with swelling and tingling of the part or vesication and desquamation of the cuticle. The strength of the patient should be supported by animal broths, mild cordials, etc. ; care being taken not to excite feverishness or headache. If gangrene supervenes, or if the reaction runs into sloughing, the sphacelated portion, if of small size, may be either amputated or permitted to detach itself by the natural process of separation. If the process involves an important member, amputation of the injured limb should be performed. This may take place at the most convenient situation for the operation as soon as the line of demarkation has fully formed ; taking care to amputate *above* the line of demarkation, and in the *sound tissues*. The operation, when determined upon, should be performed early, before the patient is exhausted from the depressing

effects of long-continued suppuration. This secures prompt union of the flap, with a sound, healthy cicatrix. In the separation of a mortified part by the natural process, the cicatrix will require weeks before it is sufficiently hard to sustain pressure, while the flap from an operation gives immediately sound and healthy tissue. To check the fetor that arises from a mortified part after reaction sets in, calendula dressing, with a portion of Labarraque's solution, may be advantageously employed. Throughout the treatment of frost-bitten parts, it should be remembered that patients suffer much more from alternations of temperature, from moisture and cold, than from mere exposure to a low degree of dry cold steadily maintained.

Violent gangrenous inflammation may be caused if heat is injudiciously applied to frost-bitten parts, or from being raised from a low to a high temperature, although the cold may not have been sufficient to cause actual frost-bite. Baron Larrey relates an example of this accident during the campaign in Poland in 1807. He says: "Preceding and following the battle of Eylau the cold was most intense, ranging from 20 to 25 degrees Fahrenheit. The troops were exposed night and day to this weather, and the soldiers of the Imperial Guard in particular were nearly motionless for more than twenty-four hours, yet there were no complaints of its effects. The next night, however, a *sudden thaw commenced*, and immediately a great number of soldiers presented themselves at the 'ambulances,' complaining of severe numbness, weight, and pricking pain in the feet. On examination, some were found to have slight swelling and redness at the base of the toes and dorsum of the feet; while the toes of others had already become black and dry." For the treatment of gangrenous inflammation from cold, reference may be made to the article on Mortification, page 278.

In **suspended animation** resulting from long exposure to cold, the phenomena are observed that have already been detailed in enumerating its constitutional effects. The treatment consists in removing the clothing from the patient, having previously placed him in a cold room, where he is entirely protected from draughts of air, and rubbing him with snow or ice-water until the circulation is in a measure restored, when he may be taken to a room of mild temperature. Warm drinks should now be administered, and the body wrapped in flannel, at the same time employing injections of

warm water. A person thus resuscitated must not be exposed to any considerable degree of heat for some time afterward, as disease of the bones would be likely to follow. *Carbo vegetabilis* should be administered in frequently-repeated doses to allay the severe pains generally consequent on a return of animation. *Arsenicum* will also be found serviceable; *aconite*, if there be congestion, with stinging pain in the head. Subsequent consequences, as catarrh or pneumonia, should be treated on general principles.

The preventive treatment demands that the circulation be kept active, and the torpor and drowsiness resisted, by-exercise, assisted by determined mental effort. Stimulants, as a prophylactic, should be used very moderately, if at all, as they tend to increase the cerebral congestion, thus favoring the disposition to sleep.

CHAPTER IX.

SPECIFIC FORMS OF INFLAMMATION.

SECTION I.

ERYSIPELAS.

THIS is an inflammatory affection resident in the superficial textures, skin, and subcutaneous areolar tissue; is exceedingly liable to spread, and tends to the true inflammatory crisis. In treating of inflammation I divided the process into healthy and unhealthy; and paradoxical as it may appear, it is nevertheless true that the variety of circumstances tending to vary this vital process have given rise to this division of the subject.

Divisions.—Authors divide and subdivide this condition in such a manner as to render it entirely disconnected and unintelligible. They speak, for example, of erythemoid erysipelas, characterized by a rash of the skin; of phlegmonous erysipelas, where not only the skin, but also the subcutaneous cellular tissue is affected, and sloughs are formed of greater or less extent. To simplify this subject, I

shall define the term erysipelas to mean an exanthematous affection, accompanied by certain constitutional derangements. Other affections resembling this may be termed *pseudo* or *false erysipelas*. For all practical purposes, then, erysipelas may be divided into two varieties, differing only in its violence and extent, viz: *simple*, or *cutaneous*, and *phlegmonous*.

Simple or Cutaneous Variety.—In this type of the disease the inflammation pervades the entire true skin, which becomes red, with more or less swelling, heat and pain of a burning and stinging character, with exacerbation at night. The inflamed part is hot and painful; the pain not so intense as in phlegmon, nor is it attended with throbbing. *Redness* is always a prominent feature, and sometimes is very bright, in consequence of which it has been designated the rose. A peculiarity of the redness is its well-defined border, having a line of demarkation between it and the healthy skin. The quantity of blood circulating in the part is not only increased, but liquor sanguinis and the coloring matter of the blood are infiltrated within the tissues. If pressure be made upon the part, the redness disappears momentarily, but is immediately renewed. *Swelling*, as a general thing, in the simple variety is not present; but often small vesicles occupy the reddened surface. In this variety the erysipelas may often resolve itself: the vesicles bursting are artificially emptied; the subcutaneous effusion is absorbed; the symptoms abate; and the part regains its normal characteristics. Sometimes, however, the process does not recede though vesication takes place; the vesicles burst and the serum is discharged, the disease running into the grade of true inflammation—constituting the second variety.

Phlegmonous Erysipelas.—In this variety the sub-integumental tissues become involved in the morbid process, the disease passing from the simple into the phlegmonous type. This is a more serious form of the malady, in which the tissues of the brain may become involved. Our attention will be more particularly directed to the disease as attacking the sub-integumental structures. The characteristics of the simple variety are now intensified. The redness passes into a deeper hue, and diffuse inflammation with swelling takes place. The line of demarkation begins to be lost in consequence of the increased effusion into the tissues, which occurs more or less rapidly, with accompanying paralysis of the vessels. Soon

a complete stagnation of blood in the part ensues, the cellular spaces being distended with fluid colored with the hæmatin. This condition is gradually merged into more or less disintegration of the tissues, with a formation of pus of low vitality, which is distributed through the cellular spaces. During this stage of the disease, *swelling* is increasing gradually and persistently—the *pain* in the part increasing in severity correspondingly with the progress of the tumefaction. A tendency to speedy ulceration and destruction of the implicated structures takes place, which sometimes ends in sloughing of the parts involved. At this juncture constitutional symptoms manifest themselves; the brain begins to show evidences of inflammation; or typhoid phenomena are manifest. Prostration becomes excessive; delirium, more or less violent, ensues—giving evidence that the system is succumbing to the combined effects of toxicæmia and the local disease.

Causes.—The causes which render the constitution liable to erysipelatous inflammation are two-fold—*predisposing* and *exciting*.

Predisposing.—Anything which vitiates the system or impairs its vitality, thereby making it more susceptible when exposed to morbid influences, is a predisposing cause.

Exciting.—The exciting may be classified under three heads, viz: *infection*, *atmosphere*, and *epidemic*. It is to be remembered that, in regard to the first, the disease may be conveyed from one person to another—the vehicle being the surgeon, nurse, or the various agents used in the treatment of a person afflicted with the disease. This impresses upon us the necessity of the utmost caution and cleanliness in the management of erysipelatous patients, and shows the importance of washing the hands thoroughly, and purifying our clothes, before approaching an uninfected patient. The poison emanating from an erysipelatous sore is conveyed from one person to another by the atmosphere, and healthy sores in this way are changed into those possessing all the characteristics of erysipelas. It sometimes appears as an epidemic, prevailing in a certain locality for a specified period, then suddenly disappearing and manifesting itself in a remote section of country. A peculiar circumstance in regard to epidemic erysipelas is, that it almost invariably attacks the face and scalp.

Terminations.—Cutaneous erysipelas may terminate in one of three ways: *First*—In resolution, leaving nothing but desqua-

mation of the cuticle, with slight œdema. *Second*—It more frequently gives rise to large bullæ or vesicles, from effusion of serum under the cuticle; these dry into scabs, which peel off and leave the cutis either healed or superficially ulcerated. *Third*—It is sometimes followed by small abscesses, which take place in the more intense variety, producing sloughing of the integuments.

Constitutional Symptoms.—Both the simple and phlegmonous varieties are ushered in with chilliness, headache, pain in the back, nausea, and vomiting; and both are attended with fever varying in its type according to the intensity of the cause, the vigor of the constitution, and the nature of the prevailing epidemic. If the disease attacks a robust, vigorous constitution, the fever will be open, frank, and of the sthenic type; if an old and debilitated subject, or a system previously deranged by disease, the fever will take on a low, typhoid character. Whenever the disease attacks the face and scalp, it will be exceedingly prone to be complicated with delirium or coma—the irritation being propagated to the brain and its membranes. Another peculiar feature of this affection is its liability to change from part to part, by metastasis. At first the face and scalp may be involved, and gradually yield to the remedies prescribed, when of a sudden the arm or leg may be attacked; or it may even leave the skin and involve some internal organ, presenting the same characteristics as the original disease.

Treatment.—In the treatment of erysipelas, attention should be given to hygienic measures and those surrounding influences which may, in the judgment of the surgeon, become predisposing or exciting causes of the malady. If it appears near a wound, the first indication is to allay the local irritation. The bandages, plaster, or whatever topical application in contact with the wound, should be promptly removed, and medicated lotions of the selected remedy, of a temperature most grateful to the feelings of the patient, be constantly applied to the part. If it occurs in hospital practice, a proper regard for ventilation, with pure air and the avoidance of over-crowding of patients, should be enforced. In hospitals, erysipelas may be generated at will by inattention to cleanliness and those necessary attributes that pertain to health. The appearance of this disease in certain rooms, and even in the same bed, as has frequently occurred in the wards of a hospital, is due to some local cause, such as an infected bedstead or bedding, upon which

the poisonous exhalations have been suffered to remain; on the removal of which the disease will disappear. Scrupulous attention, therefore, should be given to cleanliness. The nurses and dressers, as also the surgeon, when leaving a patient attacked with the disease, should wash their hands carefully with a weak solution of some of the salts of chlorine. When erysipelas has occurred in hospital practice, its further spread may be prevented by isolating the patients affected and immediately taking active measures to purify the ward from which they were removed.

The treatment of erysipelas must be directed, *first*, almost entirely to the constitutional derangement—the local disturbance being only evidence, as a general rule, of a blood disorder; *second*, to the local manifestations as they present themselves upon the surface of the body. As to the constitutional treatment, aconite will be demanded—especially in the sthenic type—in the beginning of the disease, and until the plethora of the circulation is broken down. It may then be omitted, and either one of the following remedies substituted, viz: apis, belladonna, cantharis, bryonia, or rhus tox.; or it may be continued, if the circumstances of the case require it, in alternation with the remedy selected to meet the exigencies of the disease. If the vital powers show much depression, arsenic, phosphorus, lachesis, or china may be advantageously given in lieu of the first-named remedies. Dr. Hayward, of Liverpool,* recommends, in those cases where “the vital powers show great sinking, the pure tincture of sesquichloride of iron, in doses of from five to ten drops every two hours; and, perhaps, follow this by another tincture of china or calcaria phosphorica (1st), or arsenicum (2d or 3d).” Mr. Liston treated many cases of this disease with belladonna. He says: “We subdued the fever with aconite, and then administered the extract of belladonna, and in twenty-four hours the disease had quite disappeared. How this effect is produced,” he adds, “we can not say, but it seems to act like magic; and so long as we benefit our patients we have no right to condemn the principles upon which this treatment is recommended and pursued.” Miller† also adds his testi-

* “Surgical Treatment of Phlegmonous Erysipelas,” an Essay read before the Liverpool Medico-Chirurgical Society; published in vol. xxi, British Journal of Homœopathy.

† Principles of Surgery.

mony to the efficacy of belladonna in the treatment of this disease, in the following: "Belladonna is anodyne and antiphlogistic; as an opponent of erysipelas it enjoys a considerable reputation." *Bromine*, as a prophylactic as well as curative agent in the treatment of this disease, was highly extolled by army surgeons during the late civil war in America. Surgeon Woodward, in charge of Park Barracks, Louisville, Ky., speaks of this important curative agent as follows: "Of its results, so far as its prophylactic action against erysipelas is concerned, since its use in vapor in the crowded wards of these barracks—from which, before its use, we got from five to eight cases of erysipelas per week—not one case has originated in them. In the hospital wards, where we have had as many as sixteen cases at a time, side by side with other sick and wounded men, there has not been an instance of its spreading among them. So well is its power established to prevent the spread of erysipelas, that even the ward masters and nurses, who used to dread the effects of being in the same wards with erysipelas patients, no longer fear it in the least; for they see therein perfect immunity from danger." It may be administered internally in doses of half a drop to one drop, being dissolved in glycerine and given every three, four, or six hours, according to circumstances. As a *prophylactic*, it is employed by dissolving one ounce of the solution in appropriate vessels, placing them at different points in the ward or room in numbers sufficient to secure in the apartment the constant presence of the odor of bromine. It should be borne in mind that if the vapor of bromine comes in contact with the vapor of water, hydrobromic acid is formed; therefore, when there is much of the vapor of water disengaged in the apartment, the quantity of the vapor of bromine must be correspondingly increased. As a *topical* application in erysipelas, a piece of *dry* lint is to be placed over the inflamed part; over this is to be laid another piece of lint, *moistened with the solution of bromine*; over all is to be applied a third piece *spread with simple cerate*—the whole to be covered with oiled silk and bandage, so arranged as to retain the vapor in contact with the diseased surface as long as possible, reapplying the solution as often as it becomes exhausted by evaporation.

A case reported * by Dr. F. S. Bradford, of Charleston, S. C.,

* North American Journal of Homœopathy, vol. ix, p. 62.

shows the marked efficacy of the treatment employed, and is evidence of the curative effects of homœopathic remedies in idiopathic forms of this disease. He writes: "I found the patient, late in the evening, with a pulse 120, skin very hot and dry, headache and nausea, the erysipelas having involved two-thirds of the face, which was much swollen. Remembering the great efficacy of the tincture of aconite rad. in such cases, I thought I would put it to the test, and mixed four drops of the tincture in a tumblerful of water, and four drops of rhus in a tumblerful of water; a tablespoonful at a dose, every two hours, of the aconite and rhus alternately. In the morning I found the patient comfortable, pulse much lower, headache and nausea disappeared, the skin moist and not very hot. The succeeding day the fever was entirely gone, redness and swelling abating. Medicine continued at intervals of three hours, and in one week the patient was out and recovered from the attack."

The principal points in the treatment are, to control the inflammation, antidote the poison, and limit it to the part already involved. The *first* indication may be met constitutionally by aconite; the *second* by the remedies heretofore mentioned, selecting, of course, the one which is in most perfect *rappoport* with the diseased condition of the organism.

The local treatment consists in applying externally the remedy best adapted to meet the characteristics of the diseased manifestations. If the skin is only slightly inflamed and the cellular tissue not much implicated, aconite, belladonna, cantharis, or rhus tox. lotions may be employed, either *warm* or *cold*, according to the feelings of the patient. At the *commencement* of the disease, when *superficial*, my preference is for cold applications, gradually changed to warm, then to hot, as the morbid action advances to the stage of true inflammation. Dr. Hayward also recommends the use of hot applications in those cases where the cellular tissue has become much implicated. He says: "It softens and relaxes the skin and enables it to give way to the internal distention; and by this means, as well as by keeping up a more free circulation in the skin, it at least postpones the impending mortification of the skin." When the disease begins from the first in the sub-integumental tissues, cold applications should not be employed, as they act injuriously, not only by lessening the vitality of the external parts and thus favoring local sloughing, but they are liable

to cause a retrocession of the disease and the consequent affection of some internal organ. Sometimes hot applications act injuriously by increasing the pain, especially in the more violent forms of the phlegmonous variety, where the cellular tissue is infiltrated with serum and the external parts studded with vesicles merging into ulceration and sloughing of the implicated structures. In such cases they should be promptly discontinued. "Of all local applications," says Tanner,* "which have been recommended, that which gives the most relief is the fomentation by flannels wrung out of a hot-decoction of poppy-heads, assiduously applied." *Flour* has been highly spoken of in mild cases. It possesses a soothing, cooling effect, and may be employed by being freely dusted over the inflamed part. Collodion has also been employed by some surgeons, the affected part being painted with the liquid. It not only serves to protect the skin, but is said to act beneficially by contracting the congested vessels. Various other agents have been used locally, such as the mercurial ointment, the nitrate of silver, blisters, turpentine, camphor, the mineral acids, etc. They are all inferior, however, to the homœopathic remedies previously mentioned.

Dr. E. A. Guilbert, of Dubuque, Iowa, in a valuable paper published in the Illinois State Homœopathic Transactions, advises the topical application of remedies. He cites a number of cases treated with the same remedies *externally* and *internally*, with the most satisfactory results. In one severe case arsenic was applied for twelve hours, followed by rhus rad., and in thirty-six hours the patient was out of danger. In a second case, aconite, rhus tox., rhus rad., iodine, and belladonna were employed with good results. The third case was treated with arsenic and rhus rad. internally, and the same remedies externally, the disease succumbing in twenty-four hours. In another case, a boy of nineteen had been under treatment several days; "the disease was still extending its ravages, and the cerebral symptoms were particularly ominous." Arsenic and rhus rad. were used internally, and the rhus solution was applied locally; "an impression was made on the disease within twenty-four hours, and the patient rapidly convalesced." The attenuations used internally were from the first to the sixth, and the external applications were twenty drops of the tincture to a pint of water. It is not stated whether the topical agents were applied hot or cold.

* Tanner's Practice of Medicine, p. 182.

Incisions become a most valuable remedy when the disease persists in spite of the treatment before recommended. They are especially appropriate when the swelling is great and increases rapidly; when it is hard, tense, and resisting, not soft and œdematous as in simple erysipelas; when the pain is severe and throbbing; when there is the least sensation of fluctuation or *quagginess*; or when the skin is becoming livid or dusky, or covered with livid vesicles, they are imperatively demanded. They assist the discharge of pus and sloughs, and should be made where the tension is greatest; for, as remarked by a distinguished surgeon, these matters are neither brought to the surface by pointing nor walled in by adhesion. They act not only as apertures for the discharge of fluids contained within, but also afford an effectual means of cutting short the inflammatory process by relieving tension and emptying the distended blood-vessels. In erysipelas of the throat, where the great swelling threatens suffocation by impinging on the trachea, well-timed incisions, penetrating the diseased tissues to a sufficient depth, will often prove of prompt and decided advantage in relieving the immediately-dangerous symptoms. To be of service they should be carried quite deeply through the diseased structure, and repeated from time to time as often as necessary. If hemorrhage is profuse, the bleeding should be staunched by continued pressure with the finger or other appliance, as it is not the object of the surgeon to draw blood in such cases. During the after-treatment, frequent dressing is necessary to prevent an accumulation of pus, and the sloughs should be removed as fast as they form. When the face is the seat of disease, the incisions should be small and correspondingly deep, to avoid the scars that result from too long incisions.

Under ordinary circumstances, the patient's health will continue feeble for a considerable time after recovery from this form of erysipelas, requiring change of climate, season, and bathing, a nourishing diet, and great attention to regular and correct habits of life. During the cellular variety of erysipelas, the dietetic treatment should be the most vigorous, embracing the free use of milk, essence of beef, milk-punches, etc. The late Dr. Robert Williams, of St. Thomas Hospital (remarks Tanner), gave all his erysipelatous patients milk-diet, sago, and from four to six ounces of port-wine daily, from the very first appearance of the disease, irre-

spective of symptoms or the part affected. "I have pursued this system," says he, "for several years, and I hardly remember a case in which it has not been successful." The other forms of erysipelas, briefly alluded to, do not require any separate consideration with respect to treatment. In every case the disease is the same, save that the constitutional poison is more active and virulent in some persons than in others." In the treatment of such cases, therefore, corresponding modifications will be required as demanded by the necessities of the case.

SECTION II.

FURUNCULUS, OR BOIL.

Diagnosis.—This is a circumscribed inflammation of a small portion of skin and areolar tissue, ending in death of the latter, and accompanied by laudable suppuration, always of asthenic type. It is different from a mere pimple, and unlike carbuncle. A pimple is but the inflammation of an obstructed sebaceous follicle; while carbuncle differs from the boil by its being originally more extensive, liable to spread secondarily, both generally and locally asthenic throughout, and of considerable danger to life. Boils are most frequent in the young and persons of vigorous systems, those who live well and are subject to hepatic and stomachic derangements. Its most common location is where the skin is the thickest and united with a considerable quantity of areolar tissue—as the back, hips, shoulders, back of the neck, and thighs. They are rarely seen singly, but appear in numbers; and consecutive crops are observed, the one inflaming and suppurating while the other is germinating. It is a prominent, hard, red, and circumscribed tumor, and exquisitely painful. Its apex is yellow, and the base hard and red where the slough commences. Sometimes the slough or core consists only of areolar tissue; sometimes a portion of the true skin is implicated, and frequently having added to it a portion of fibrinous exudation. If the boil is left to itself, it bursts at its apex, and the matter exudes by a single opening, which is not sufficient, however, to permit a free exit to the slough. When purulent discharge takes place, the pain, heat, and surrounding swelling abate, but the difficulty will not be obviated until the core is disposed of. In some

instances boils succeed severe febrile diseases and their attending convalescence. In other cases the system appears to acquire a cachectic condition, often without an appreciable cause, and this terminates with a critical eruption of boils. They may be occasioned by a sudden change in the habits of life, as from sedentary to active pursuits, and *vice versa*. Most frequently they appear in the spring of the year.

Treatment.—In the treatment of boils, the constitutional condition of the patient, on which the disease is dependent, should be carefully investigated. If they occur in a cachectic or debilitated state of the system, those remedies will prove of value which increase the vigor or tone of the vegetative processes. When associated with pompholyx, arsenic becomes a curative remedy. In a few instances the surgeon will be at a loss not only to determine its cause, but to adapt remedial measures to the cure of the disorder, the disease appearing to terminate of itself rather than to be brought to a close by medicinal agents. The most successful constitutional remedies, and in which I have found the greatest relief, are: calcarea muriatica, hepar sulph., calc. phosph., ferrum, and sulphur. As prophylactics, arnica, bryonia, and nux vomica are often efficacious in eradicating the disposition to boils. If suppuration proceeds slowly and the parts put on an indolent character, mercurius will be found of service.

The local treatment of this disease is exceedingly simple. When boils are forming, a useful dressing is a warm spirit lotion, kept applied with lint and oiled silk. A most valuable local expedient is a solution of the muriate of lime—two drams, to three ounces of water. Dr. Kallenbach, Sr., of Utrecht, first brought this remedy to the notice of the profession.* Having been afflicted with boils every three or four years for near twenty years—which, under the use of arnica, hepar, and poultices, tormented him “ten or fourteen days before the so-called core” could be extracted—in a subsequent attack he used the above solution of lime to a boil the size of an apple, formed in the perinæum, which had resisted all the usual remedies. The formation of matter went on slowly, and the fluctuations were barely perceptible. The following night he was quiet and almost free from pain, and in twelve hours the

* Pub., May, '61, in the Neue Zeitschrift für Homöopathische Klinik.

boil opened and discharged about one-third of its volume of thin, bloody pus.

When the boils break, they discharge a thick pus, together with the central core, leaving a small cavity in and under the skin, which soon fills up. The surgeon may find it necessary in some cases, if they are large and do not dispose to break with the applications above mentioned, to open them with a crucial incision. The cavity may be filled with lint wet with the calendula lotion, and strips of plaster applied to retain it *in situ*. When boils commence as a small, *irritable* pustule, they may sometimes be retarded by an application of nitrate of silver or the bichloride of mercury.

SECTION III.

ANTHRAX, OR CARBUNCLE — CHARBON AND ERGOTISM.

Diagnosis of Anthrax.—This is a much more extensive and altogether more important affection than the preceding. The type of the inflammation is of the asthenic variety. The areolar tissue is the part involved, which sloughs at the beginning of the disease. The skin is secondarily and less involved, becoming gangrenous to a small extent only, and having the appearance of small, unconnected patches. It begins with a hard, circumscribed, livid, red swelling, and with severe burning and smarting pain. Its most prominent part soon becomes soft and quaggy, and numerous small ulcerated apertures form on it, which give exit to a thin discharge, compared by Sir A. Cooper to flour and water. These ulcers gradually unite and form a considerable opening, from which a slough of cellular tissue is slowly protruded. The surrounding integument is livid, painful, and swollen. According to Dr. Prout, there is accompanying this affection a saccharine state of the urine. The most usual situations of carbuncle are the back, the nape of the neck, and the nates. The tumor may vary in size from that of a quarter of a dollar to a large plate; is of a dusky-red hue, slightly elevated, but never losing its flattened, circular shape. This affection has many points of resemblance to the furunculus; yet it differs in many particulars, among which are its greater size, the dusky red of the inflamed integument, its broad, flat character, and the large quantity of slough contained in proportion to the small

amount of purulent discharge. Unlike boils, carbuncle is exceedingly rare in young people, and never occurs in robust individuals, being met with in persons of a debilitated and irritable habit of body, who have passed the middle period of life.

Prognosis.—The prognosis is dependent on the size and seat of the affection, the age and constitutional vigor of the patient, the extent of the tissues involved, and the severity of its effects upon the person before the surgeon is called to the case. Under ordinary circumstances, a favorable prognosis may be given.

Treatment.—The indications for the treatment of this affection are—*first*, to administer those constitutional remedies whose pathogeneses control the morbid manifestations as they become cognizable to the surgeon, thereby destroying the cause of the local disorder; *second*, to favor the exit of the gangrenous areolar tissue, and to assist the reparative efforts of nature in establishing a healthy action in the part diseased. The first indication will be met by the use of arsenicum, belladonna, rhus, and silicia, in such quantities and frequency as may be determined by surrounding circumstances.

Aconite is useful if any constitutional fever accompanies the disease. Dr. Hemple recommends this remedy when “the inflammation involves the muscular tissue, which is hot, red, and sore, and after a while sloughs off.”

Arsenicum is *par excellence* the curative agent in this disease in every stage and condition, and is in more perfect *rappor*t with the constitutional symptoms connected with carbuncle than any known remedy. The cases successfully treated with this drug are without number, some of which had resisted all appliances of allopathic practice, and finally succumbed to the use of this remedy alone. Dr. Botsford, of Illinois, reported* a case of carbuncle of the size of a common tea-saucer, situated on the lower cervical vertebræ, which had resisted for three weeks all the armamentaria of allopathic therapeutics. It was treated with ars. (1), externally and internally, and cured in four days. Prof. Temple, of St. Louis, also reported† a case of a patient who came to his office “with a carbuncle which had been treated by several surgeons without success.” He gave ars. (13) internally, and calendula water externally, “which arrested the discharges and cured

* Proceedings of Societies—N. A. Jour. of Homœopathy, vol. ix, p. 165.

† Ibid.

the patient." Prof. Small, of Chicago, has treated a number of patients with ars. and silicia internally, and bread-and-water poultices applied externally, with most satisfactory results. In another case, a man sixty years of age was seized with a carbuncle of the most malignant type; in fact, so malignant that it was pronounced fungous hæmatodes by allopathic physicians. It was situated in the back of the neck, and was of the size of a tea-saucer, oblong in shape, elevated about three inches, gangrenous in the center, the outer parts being hard, bluish, and irregular. It was treated with a saturated alcoholic solution of arsenic, applied to the ulcerated surface with a brush wet in water, and five drops of the solution put upon it; two drops of the solution were given internally three times a day. The symptoms abated immediately, and in six days the sore appeared healthy, and healed up rapidly.

Pyrola rotundifolia, or the cancer lettuce, is mentioned by Drs. Hill and Hunt* as a valuable agent in the cure of this affection.

Belladonna is indicated when complications arise denoting cerebral irritation.

Muriatic acid is recommended where carbuncle occurs in scorbutic persons.

Calcareo muriatica has been employed by Rademacher in the most malignant forms of this affection, with the most gratifying success.

China becomes a valuable agent in those cases where the patient has been reduced by loss of blood, or if the disease is kept alive by malarial poisons.

The local treatment consists in making free incisions into the part as soon as ulceration has commenced and sloughs are formed; and to have the best effect they should be made early and throughout the whole extent of the structures diseased. This is done not only to evacuate the purulent formation, but to afford an easy access to the sloughs. In many cases, however, which have been seen early and the proper remedies given, the inflammation has been dispersed, and suppuration and ulceration prevented without the necessity of incisions. After incising the part and turning out the diseased mass, the ulcerated surface should be dressed with either a solution of arsenic, calendula, or *calcareo muriatica*, and the dressings

* Hill and Hunt's Practice of Surgery, p. 240.

retained by means of straps and the four-tailed sling, when seated on the upper part of the neck, as represented in Fig. 77.

Malignant Pustule, or Charbon.—This disease is caused, says Larrey, by “the general or partial absorption of certain deleterious gaseous effluvia, very abundant in some marshy districts in the middle of France. The places most exposed to these exhalations are the sewers or cemeteries which remain covered with snow during the winter, the neighborhood of stagnant waters or those temporary ponds formed by the melting snows or rains of winter, which, drying up, leave a prodigious number of animalculæ; these, putrefying, generate the pernicious exhalations.”

Symptoms.—The disease begins with an itching and shooting pain in the part. Soon this point becomes red and slightly swollen, and resembles the bite of some poisonous insect. Vesicles quickly appear on the spot, filled with lemon-colored serum, with an areola at first red, then livid; the swelling extends to surrounding parts, the vesicles burst, and the fluid escapes; the part now becomes black, dried up, and hard, strongly adhering to the tissues beneath; the areola enlarges, assumes a livid color, and takes on all the characteristics of gangrene.

Treatment.—The treatment of this affection is identical with carbuncle, to which the student is referred for details. The disease, however, is so rarely met with in this country that a further consideration need not be entertained in this work.

Ergotism, another variety of gangrenous diseases, which consists of a peculiar *dry gangrene* of the extremities, induced by eating spurred rye, is also rarely met with in this country, and hence needs no further attention. Its treatment, when occurring, is the same as mentioned under the head of Gangrene.

PART IV.

DISORDERS FROM PERVERTED NUTRITION.

CHAPTER I.

TUBERCULOSIS.

By TUBERCULOSIS, scrofula, or struma, is meant a constitutional condition that leads to the development or deposit of a peculiar formation designated as *tubercle*. The constitutional condition that tends to this is sufficiently characteristic to be readily recognized; still, a person may be said to possess a scrofulous tendency or diathesis without laboring under the fully-declared disease, in which latter case there will be a disposition to tuberculous matter in some of his tissues or organs.

Etiology.—It may be either hereditary or acquired, though in the great majority of instances it undoubtedly originates from some peculiar taint transmitted from parent to child. Its development in persons of healthy parentage is rare, though quite possible, as it may supervene as a sequel of scarlatina, small-pox, measles, or from any disorder impairing the general nutrition of the body.

The **scrofulous diathesis** is often erroneously confounded with general debility, but is by no means synonymous with weakness of constitution. Debility often exists without any scrofulous tendency or taint, more particularly in persons of the nervous temperament. Many delicate people, though weak, are perfectly healthy, showing no disposition to this affection; on the contrary, the scrofulous constitution is frequently conjoined with great muscular power and mental activity. But though no weakness may be manifested in either of these respects, scrofula is invariably attended by debility or perversion of the nutritive activity of the body. - This is espe-

cially manifested in certain tissues, as the mucous and the cutaneous, and in those organs with low vitality, as the lymphatic glands, the bones, and the joints. In these, scrofula is particularly apt to influence the products of nutrition and inflammation—more especially in the earlier periods of life, when these actions are most energetic—in such a way as to render its existence evident to the surgeon. It is this tendency to the occurrence of particular diseases, and to the ingrafting of special characters on affections of certain tissues, that may be considered as indicative of the existence of the scrofulous diathesis—of that condition which, in its full development, gives rise to the deposit of tubercle in organs and tissues. The existence of this diathesis is marked by the presence of a peculiar temperament, by special modifications of the seat, form, and products of inflammation, and by the formation of tubercle.

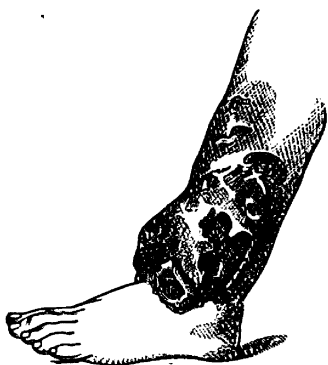
The **scrofulous temperament** assumes two distinct forms, and each of these presents two varieties. The most common is that which occurs in persons with fair, soft, transparent skin, having clear blue eyes with large pupils, light hair, tapering fingers, and fine, white teeth, together with roundness of outline, and whose growth is rapid and intellect precocious. In these individuals the affections are strong and the procreative powers quite considerable; the mental activity is often great, and is usually characterized by much delicacy and softness of feeling, and vivacity of intellect. Indeed, it would appear, in such persons as these, that the nutritive, procreative, and mental powers are rapidly and energetically developed in early life, and hence become proportionately early exhausted. In another variety of the fair scrofulous temperament we find a coarse skin, short and rounded features, light gray eyes, crisp and curling sandy hair, a short and somewhat ungainly stature, but not uncommonly (as in the former variety) great and early mental activity, and occasionally much muscular strength.

In the *dark* form of the scrofulous temperament we usually find a somewhat heavy, sullen, and forbidding appearance; a dark, coarse, sallow, or greasy-looking skin; thick, harsh, curly hair; a small stature, but often a powerful and strong-limbed frame; with a certain degree of torpor or languor of the mental faculties, though in some instances the powers of the intellect are remarkably well-developed. The other dark strumous temperament is characterized by clear dark eyes, fine hair, sallow skin, and by mental

and physical organization that closely resembles the first-described variety of the fair strumous diathesis.

General Symptoms.—In all these varieties of temperament the digestive organs will be found to be weak and irritable. This may be regarded as one of the most essential conditions connected with scrofula, and as tending greatly to the impairment of nutrition, which is so frequent in this affection. The action of the heart is feeble, the blood is thin and watery, and there is a tendency to coldness and often to clamminess of the extremities. The most marked characteristic of struma, however, is the peculiar modification which inflammation undergoes. The *course* of the inflammatory action is always slow, feeble, and ill-developed—the more active and sthenic conditions being rarely met with. In its *form* it is usually congestive, ulcerative, or suppurative, the *products* being characterized by little tendency to adhesion. Its *seat* is chiefly the skin and mucous membranes, the joints, and the bones, occasioning a great variety of special diseases, according as one or the other of these structures is affected. And whatever the variety of temperament, the patient usually emaciates, becomes sallow, cachectic, and debilitated, at length falling into a state of hectic or marasmus. The *skin* is often the seat of scrofulous

Fig 140.



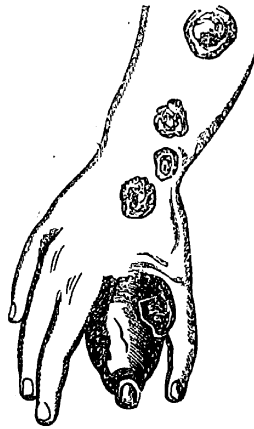
disease, the latter manifesting itself in a variety of cutaneous eruptions—especially the different forms of eczema of the scalp—and various ulcers on the surface, usually weak and largely granulating, with considerable swelling of the surrounding parts and a tendency to the formation of thin, blue, and glazed cicatrices. The integuments of the whole of the limb may become much diseased in this way, œdematous, infiltrated, and covered by flabby ulcers and fistulæ,

the parts becoming, perhaps, double their natural size, Fig. 140. This condition is met with in the arm and leg, and may become so severe and intractable as to demand amputation.

The *mucous membranes* are frequently extensively affected, and often present the earlier forms of scrofulous disease in childhood.

This is more especially the case with those of the eyelids and nose. The conjunctiva becomes chronically inflamed, with perhaps ulceration of the cornea. The mucous membrane of the eyelids may be permanently congested and irritated, with loss of lashes, constituting psorophthalmia. The mucous membrane lining the nostrils may also become chronically congested, giving rise to symptoms resembling a constant cold. Occasionally, too, the lining of the antrum becomes irritated, and may occasion an enlargement of this cavity, or perhaps a discharge of unhealthy pus into the nostrils. The larynx may be the seat of various forms of aphonia, dependent on congestion. The genito-urinary organs not unfrequently show a marked tendency to debility and irritation, very slight exciting causes producing discharges from the urethra which are often very lasting in character. The *bones and joints* are liable to the occurrence of various forms of caries and necrosis, Fig. 141, more especially those that are spongy in their texture, as the short bones of the foot and the articular ends of long bones. The joints are liable to that large class of affections that are commonly included under the term of *white swelling*, and which consist of thickening, disorganization, ulceration, and suppuration of the synovial membranes and cartilages. The *glandular organs*, especially the lymphatic glands on the side of the neck and under the angles of the jaw, are peculiarly prone to scrofulous disease.

Fig. 141.



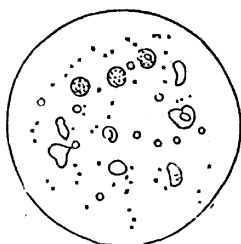
These glandular enlargements are disposed to run into unhealthy and chronic suppuration. The testes and mammae are occasionally affected; and other glandular structures, though sometimes implicated, are not so commonly affected as those mentioned.

Anatomy of Tubercle.—Tubercle, according to Erichsen, can not be looked upon as a specific affection, but must be regarded as a perverted or unhealthy development of the nutritive materials destined for the repair of the body and the restoration of the blood. Simon considers it a disease of the lymph, or nascent blood. The scrofulous diathesis he defines as a peculiarity of blood development, under which the nascent blood tends to molecular death by superoxydation. Williams says that tubercle is a degraded condition of the nutritive

material from which the old textures are renewed and the new ones formed, and it differs from fibrin or coagulable lymph not in kind, but in degree of vitality and capacity of organization. Adopting the theory of cell action, as presented by Addison and Virchow, the tuberculous matter may be pronounced the result of a necrosis of other cells or of glands, the local nutrition of which is impaired by the impoverished character of the blood furnished through the general circulation. Gregg, of Buffalo, who has also investigated this subject quite extensively, believes it to be a product consequent on a peculiar condition of the blood, resulting from a loss of its albumen. Tubercle occurs in two forms, as semi-transparent, gray granulations, smooth and cartilaginous in look, somewhat hard, closely adherent and accumulated in groups, often with a good deal of inflammatory action in the surrounding tissues. They have a tendency to run into masses, and to constitute the second form—the true yellow tubercle, which is met with in opaque, firm but friable concretions, of a dull whitish or yellowish color, homogeneous in structure, and without any appearance of vascularity. Tubercular deposits have been observed in nearly every structure of the body.

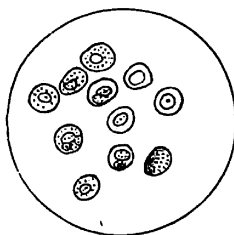
Microscopical Character.—Under the lens, it is seen to consist of a transparent matrix containing granules, nuclei, cells, and oil globules, the proportion of which is variable. The true tubercular corpuscles are round, ovoidal, or oblong, or perhaps almost shapeless, and constitute a large proportion of the morbid product. It bears a close resemblance to pus, from which it may be distinguished by reference to its chemical character, Figs. 142 and 143.

Fig. 142.



Tubercle.

Fig. 143.



Pus.

Chemical Character.—It consists almost entirely of albumen, or protein matter, there being a small proportion of earthy salts, as phosphate and carbonate of lime. Occasionally there is a little fibrin, casein, extractive matter, and pyine.

Diagnosis.—It is not always easy to distinguish scrofulous humors from enlargements of glands due to chronic inflammation and hypertrophy, producing what is described as adenoma. In *acute* affections of the structures liable to be affected by the occurrence of tubercular deposits, the diagnosis is readily made in view of the rapid progress of the inflammation. It often requires the most careful study in order to discriminate between them and cancerous formations; and as regards the prognosis, it is highly important that no error should be made. They can usually, however, be distinguished from schirrus by the stony hardness of the latter, together with the lancinating character of the pain; in other cases no positive diagnosis can be given until the disorder has progressed so near its characteristic termination as to be unmistakable.

Prognosis.—Glandular tumors consequent on tuberculous deposits are seldom, of themselves, so severe as directly to occasion death, but may be indirectly the cause by terminating in a chronic form of abscess, which occasionally proves fatal from its exhaustive discharges. Provided there be a deposition of tubercular matter in some of the internal organs—as in the mesenteric glands, membranes of the brain, and the lungs—the prognosis is decidedly unfavorable.

Treatment.—The treatment of scrofula consists not only in endeavoring to prevent the full manifestation of the disease, but also in removing it whenever existing. Thus, it is divided into two varieties, according to the individual characteristics, or rather to its degree of development; these are the *preventive* and *curative* forms of treatment.

The *preventive* treatment is perhaps equally important with the curative, for every homœopathic practitioner has witnessed cases where the development of the affection, even when hereditary, has been stayed; the child of strumous parents, possessing the distinctive characteristics of scrofula, but maturing into manhood without a development of the disease. To be successful, this treatment should be begun early and continued uninterruptedly for months, and perhaps years. Its importance, in the first place, consists in unremitting attention to the laws of hygiene. The food should be of the most bland and nutritious kind, care being taken that the stomach be never overloaded, as neglect of this precaution gives rise to irritability of the mucous membrane of that

viscus; nutrition and assimilation are imperfectly performed; the undigested food, passing out of the stomach in the form of lithates or other products of mal-assimilation, impairs rather than improves the nutritive function. The use of stimulants, so much lauded by the allopathic school, especially in liberal quantities, is destructive to perfect digestion, clogging the healthy action of the nutritive processes. Whenever such remedies are used, only those of the lightest and most nutritious character should be allowed, and partaken of sparingly and at occasional intervals. Among the most beneficial are milk-punch, egg-nog, porter, ale, and light wines. Fresh meats, as beef, mutton, venison, fowls, the different varieties of game, and oysters, should constitute the principal articles of diet. Bread, rice, meal, grits, potatoes, carrots, and other farinaceous substances, may be made to take the place of the more watery and succulent vegetables. Attention should be paid to the various secretions, to see that they are conducted normally. Scrofulous patients being peculiarly sensitive to cold, moisture, and alternations of temperature from heat to cold, their clothing should be warm, and the whole of the body be carefully covered to correspond with the changes in the atmosphere. The patient's room should be thoroughly ventilated, and the luxurious practice of sleeping in a room with a fire can not be too highly reprobated. Freedom of exercise in the open air, but not carried so far as to produce fatigue, should be recommended; and change of climate, from mountainous regions to the sea-shore, and *vice versa*, has often been productive of the most satisfactory results. Bathing, also, whether in river or sea, the tepid or cold sponge bath, with the habitual use of friction, in order to impart a healthy action to the skin and to preserve the activity of the cutaneous circulation, should be regularly practiced. Calisthenic exercises, the various games of ball, and the gymnasium, are all potent renovators and preservers of the nutritive function, if moderately indulged in, and at proper seasons of the year. Riding on horseback, especially in the early part of the day, when not carried to excess, is one of the most important adjuvants in establishing a normal condition of the secretions and excretions of the human organism.

The *curative* treatment, like the preventive, should be especially directed to the general impairment of nutrition, and through it to the more perfect augmentation of constitutional vigor.

Scrofula being a consequence of mal-nutrition, those remedies which, acting upon the processes of digestion and assimilation, improve their tone and vigor, are necessarily curative of this disease. In the treatment of scrofula, as in all chronic diseases, the greatest reliance should be placed on the higher dilutions and triturations, giving them at longer intervals than in acute diseases. On this subject, Dr. Lutze remarks: "In cases of *chronic diseases*, or diseases which run a long course, have existed for years, and deeply taint the organism, as deafness, blindness, gout, paralysis, old eruptions, open sores and old ulcers, fistulæ, herpes, curvatures of the back and bones, caries of the bones, *the medicine should never be frequently repeated, nor should the same medicine be given twice in succession.* Each dose should be allowed sufficient time to develop its full effect, since it is the subsequent action of the drug that achieves the cure."

In the earlier stages of the disease, and during the period of development, which is manifested by a swollen and even indurated condition of the lip, with emaciation, flabbiness of the muscles, distention of the abdomen, paleness of the countenance, aversion to meat and vegetables, with craving for bread and butter, molasses, sweets, etc., the following remedies have proved exceedingly efficacious, viz: China, belladonna, ferrum, cinchona, arsenicum, silicia, calcaria, ignatia, nux vomica, sulphur, aurum, sepia, dulcamara, and oleum jecoris. In an advanced stage, and when the disease is more fully developed—with enlargement of the lymphatic glands, especially of the neck; the swellings at first being soft and movable, afterward hard and fixed, and remaining painless until inflammation sets in; disorder of the stomach and bowels, showing an increased disturbance of digestion and nutrition; the symptoms of the early stage increasing and becoming more prominent—recourse may be had to rhus tox., dulcamara, conium, spongia, baryta carb., aurum, lycopodium, sulphur, iodine, mercurius, and sepia. As the disease progresses, the affection of the lymphatic glands increases, involving the reproductive system; secondary derangements occur; the glands become more stony in feeling; new indurations make their appearance in different portions of the body; the abdomen becomes hard and distended, with more or less derangement of its functions; the mesenteric glands become inflamed and enlarged, and mesenteritis is fully developed. Conjoined with this, the con-

glomerate glands, parotid, sublingual and submaxillary glands, the pancreas, thyroid body, and sometimes the liver, enlarge and become indurated. Deglutition, per consequence, is seriously impeded, and dyspepsia and jaundice follow in the train of morbid phenomena. The disease, extending, involves the eyes, producing blennorrhœa of the meibomian glands, obscuration of sight, cataract, and even amaurosis. The reproductive system is more and more involved in the morbid process, the patient emaciates, disease of the pulmonary tissue takes place, with accompanying hectic, and the patient dies from exhaustion. This is the picture of scrofula when the disease runs its course uncontrolled by remedial agents. Fortunately, however, under homœopathic therapeutics this result is of rare occurrence, especially when the patient is seen in the early stages of the malady.

In the last stage, affection of the glands and derangement of the reproductive system reach the highest degree of development, affecting the bones and cartilaginous tissues, and resulting in curvature. If children are attacked, they are unable to walk unassisted, and consequently crawl or move about on their nates, the legs being bent inward. The heads of bones become enlarged and thickened, the diaphyses are thin and feeble, the legs become curved, the teeth are carious, and finally curvature of the spine sets in, with a complication of deformities. In other cases, chronic inflammation takes place in the larger joints of the body, succeeded by dropsy, ankylosis, and caries. The head also becomes involved; the fontanels remain open, the sutures of the skull widen, and chronic hydrocephalus has been developed. The child looks old and deformed—the enormously-enlarged head and abdomen are disproportionate with the rest of the body, the eyes are deep-seated, the flesh is flabby, and general decay seems to have invaded the body. The mind remains clear, and is even prematurely developed. If convulsions, epileptic fits, and spasms take place, they may be met by the use of ignatia, opium, conium, stramonium, or hyoscyamus, as indicated by the accompanying symptoms.

For the accompanying fever which generally attends this condition, as well as to cover the symptoms in their totality, there is no remedy superior to *belladonna*. It is indicated by a cachectic condition, emaciation, dry skin, distended abdomen, glandular enlargements, with bloatedness of the face and extremities. It may

be followed by arsenicum, china, staphisagria, or ferrum, according to circumstances.

It is unnecessary for me to give the pathogeneses of the different remedies which have been recommended for the curative treatment of this disease. Suffice it to say, whatever remedies are used must be directed against the totality of the symptoms, with especial reference to the condition of the tissues as they may be implicated in the morbid process.

The *local* treatment consists in the application of those agents that are recommended in the local management of inflammation, modified according to the seat and peculiar nature of the affection. When matter forms, it should be let out in accordance with the rules laid down in treating of the more chronic forms of abscess.

The propriety of operating, whether for the excision of a tumor, resection of a joint, or the amputation of a limb, is still a vexed question among surgeons. In these cases, says Erichsen, operations should not be undertaken too hastily, too early in the disease, or especially in very young subjects. The affection being a constitutional one, it will often be found—as the general health of the patient improves by proper treatment—that the local mischief, which at first appeared of a very intractable character, gradually assumes a more circumscribed and healthy form, and in fact to a great extent undergoes spontaneous cure by a restoration of healthy action in the parts. This is especially true of young children, in whom very extensive disease of the bones and joints may often be recovered from without the necessity of any serious surgical interference. If an operation should be entertained, it should not be attempted while the disease is still spreading, as suppurative inflammation will set up in the wound itself, involving the soft tissues and bones to an extent even greater than before, and which is impossible to heal.

In some cases of strumous disease affecting the integuments of the arm, leg, or foot, attended with great and irregular deposition of plastic material, followed by ulceration of a chronic and intractable character, amputation of the limb is the only resource. This is especially advisable when hectic supervenes in consequence of such disease, as without the operation the patient will speedily sink under the strumous suppuration.

CHAPTER II.

VENEREAL DISEASES.

THE affections arising from sexual intercourse include three distinct varieties, viz : **Gonorrhœa**, **Chancroid**, and **Syphilis**. These were for a long period regarded as due to the action of one and the same poison, its various modifications being explained as dependent on idiosyncrasy, temperament, constitution, hygienic influences, coexisting diseases, and the like. The investigations, however, conducted during the present century, have led many of the most able and scientific of the profession to adopt the above classification as entirely consistent with the most sagacious observations of clinical experience. It has not only been shown that these diseases have no essential connection, experiment having demonstrated the impossibility of producing one from the other by inoculation or otherwise, but also that they are not opposed to each other, as they may all exist in the same individual at the same time, each exhibiting its distinctive character.

SECTION I.

GONORRHŒA.

Definition.—Gonorrhœa is the term applied to an affection of the mucous membranes of the genital organs, characterized by an increased secretion and discharge from the diseased surface. It is highly contagious, arising in all cases from the application of a peculiar poison to the parts affected. Its usual seat in the male is the urethra, which, in the early stages, is confined to the neighborhood of the fossa navicularis ; it may eventually, however, extend over a much greater surface, affecting the entire length of the canal, and even extending over the whole mucous lining of the bladder. In the female, the vagina is more frequently affected than either the urethra or vulva ; the uterus the least frequently of all.

Synonyms.—Other terms have been employed at different times to correspond with the prevailing ideas of the nature of this disease, but which, from their derivation, are quite as erroneous as the term gonorrhœa itself, which is derived from two Greek words, signifying *sperm*, and *to flow*—it being formerly regarded as a flow of semen. By the French it was denominated “blennorrhagia,” and “blennorrhœa” (from the Greek: *mucus*, and *to flow*), which is also incorrect, as the discharge does not consist of a flow of mucus alone, but of a mixture of mucus with pus. The English name, “clap,” is derived from the French word *clapier*, signifying the low places where it is contracted. “Chaudepisse,” a term also from the French, is applied in view of the fact that there is more or less *ardor urinæ* at the commencement of the disorder.

History.—Gonorrhœa has existed from the earliest ages of which we have any record. It is evidently referred to by Moses, in the 15th chapter of Leviticus, in which rules are prescribed for the government of those affected with “a running issue out of the flesh.” Herodotus speaks of a disease “which is characterized by a running from the penis.”* Celsus describes balanitis and gonorrhœa, regarding the latter as dependent upon an ulcer within the urethra.† It was subsequently described by Mesue, in 904; by Halli Abbas, who wrote in 980; by Abucasa, an Arabian of the eleventh century; by Constantine; by Michael Scott, in 1214; by Guy de Chauliac, John Arculanus, and by John Arden, in 1371; as well as by many others. And since the close of the fifteenth century every medical writer has been familiar with the symptoms of this disease.

The distinctive character of gonorrhœa, as compared with syphilis, is so universally acknowledged, and so apparent from its symptoms, course, termination, and susceptibility to the action of remedies, that it demands only a passing notice. It is, therefore, only to be remarked that it possesses no point of resemblance to the syphilitic type of venereal disease in any particular, aside from its mode of transmission by sexual intercourse; for, while gonorrhœa is characterized by the symptoms of catarrhal inflammation common to mucous membranes—exposed to complications seated in organs having direct communication with the urethra by contiguity of

* Clio, liber i.

† De Medicinâ, book vi, chap. 18.

mucous surface, as the testicle, bladder, and prostate, and terminating in complete restoration to health by treatment not in the least adapted to syphilis—the latter disease commences with an ulcer, followed by constitutional symptoms, with complications seated in the lymphatic system, and amenable to a course of treatment that would be ill-advised in the former.

Complications.—The complications of gonorrhœa are quite numerous and important—some of them often becoming more serious than the original disease. The following, as balanitis, prostatitis, epididymitis, and cystitis, derive their names from the part implicated, and are sometimes dependent upon other causes than a previous exhibition of gonorrhœal inflammation. The latter statement is also true of phymosis, paraphymosis, stricture, and gleet, which often supervene.

Etiology.—Gonorrhœa generally proceeds from direct contact of the mucous membrane of the part with a discharge occasioned by the existence of the same disease. There is, however, another mode of origin, which has not escaped the notice of attentive observers, and which is fully admitted by the most worthy authority, such as Bumstead, Ricord, Fournier, Thompson, Skey, and others.

Ricord says: “If we investigate with the greatest care the exciting causes of gonorrhœa—and I am now speaking of the most characteristic cases of the disease—we can not help admitting that a gonorrhœal virus is absent in the majority of cases. Nothing is more common than to find women who have occasioned gonorrhœa unsurpassed in intensity and persistency, and attended by the most serious complications, who are yet only affected with uterine catarrh, which is sometimes hardly purulent. In many cases, intercourse during the menstrual period appears to be the only cause of the disease.”*

Fournier writes: “Gonorrhœa is, I think, much less frequently contracted from contagion than from excessive coitus, repeated or prolonged sexual congress, or peculiar excitement during the act.”†

Thompson writes: “It is a fact too well-established to render it necessary to adduce evidence respecting it here, that urethritis in

* *Lettres de la Syphilis*, 2d ed., p. 29.

† *De la Contagion Syphilitique*, p. 118.

the male is sometimes caused by contact with the other sex, from discharges which are not venereal in their origin."*

And Mr. Skey says: "I can not entertain a doubt that a very considerable proportion of cases of gonorrhœa are *not* the product of a specific poison. * * * It is notorious that leucorrhœa will produce gonorrhœal discharge."†

And from my own experience I have been fully convinced that this disease is capable of being generated by sexual indulgence either immediately before, during, or after the menstrual period, as well as by certain forms of leucorrhœa. That the peculiar poison necessary to the production of gonorrhœa does not always exist in menstrual and leucorrhœal discharges, is also quite evident.

Bumstead writes: "Of one thing I am *absolutely certain*, that gonorrhœa in the male may proceed from intercourse with a woman with whom coitus has for months and even years been practiced with safety; and this, too, without any change in the condition of her genital organs perceptible upon the most minute examination with the speculum. I am constantly meeting with cases in which one or more men have cohabited with impunity with a woman, both before and after the time when she has occasioned gonorrhœa in another person; or less frequently, in which the same man, after visiting a woman for a long period with safety, is attacked with gonorrhœa without any disease appearing in her; and, after recovery, resumes his intercourse with her and experiences no further trouble. The frequency of such cases leaves no doubt in my mind that gonorrhœa is often due to accidental causes, and not to direct contagion."‡

It is also quite impossible to distinguish gonorrhœa resulting from the menstrual or leucorrhœal fluid from that induced by contagion. And instead of its always assuming a mild type (as sometimes asserted), with a tendency to terminate in speedy resolution, it is often of the most intractable character, being occasionally followed by a persistent gleet.

Symptoms.—The symptoms of gonorrhœa in the male may be divided into three stages: 1. The incubative stage, or the period of irritation. 2. The inflammatory stage. 3. The chronic stage.

1. The symptoms indicating the *stage of irritation* usually

* Stricture of the Urethra, p. 120.

† London Medical Gazette, vol. xxiii, 1838-39, p. 439.

‡ Bumstead on Venereal Diseases, p. 64, et sequitur.

manifest themselves in from three to five days after an impure connection, though it is possible that only a few hours may intervene; while in other cases the attack may not occur until the fourteenth day. The patient first experiences some degree of heat and tingling or itching at the orifice of the urethra, due to congestion of the membrane. The lips of the urethra are somewhat red and swollen, and moistened with a small quantity of colorless and viscid fluid which glues the lips of the meatus together. Attempts to urinate are accompanied by a burning and smarting sensation, owing to the increased sensibility of the canal. In the meantime the discharge increases in quantity, gradually losing its clear, watery appearance, and assumes a milky color, which is found by microscopic examination to consist of mucus and pus globules. During this stage—which usually lasts from two to four days—the disease is confined to the external portion of the urethra.

2. The *second stage*, or that of inflammation, may generally be said to have fairly commenced in about a week after exposure. It is characterized by an intensity of the previous symptoms. The discharge now becomes abundant, thick, and of a greenish-yellow color; there is severe pain while urinating, with heat and smarting, the stream becoming diminished in size and forked, or otherwise irregular, and passed with increased frequency. The urethra is now considerably swollen, firm, and cord-like to the touch, and highly sensitive. Nocturnal erections now become a source of intense suffering, and which are particularly apt to occur during sleep, or by the patient becoming warm in bed. The penis becomes bent in the form of a curve, with its concavity looking downward. This condition, termed **Chordee**, is occasioned in consequence of an effusion of plastic lymph around the urethra, gluing the tissues together. Hence, in a state of erection, the corpus spongiosum surrounding the urethra, not being able to distend itself, acts like the string of a bow. The erections sometimes become so violent as to produce rupture of the mucous membrane, thus occasioning hemorrhage more or less profuse. During this stage, also, the lymphatics of the penis are apt to become affected, and not unfrequently the irritation extends to the glands of the groin, producing sympathetic buboes. Abscesses have sometimes formed in the cellular tissue covering the urethra, and have been known to attain a large size. This stage is somewhat variable in duration, depend-

ing much upon the constitution, habits, and number of previous attacks. It usually, however, continues from one to three weeks.

3. *The chronic stage* possesses no peculiarities by which it is known, other than a gradual decrease of the more active symptoms characterizing the preceding stage. The discharge becomes diminished in quantity and less purulent, finally consisting almost entirely of mucus before disappearing completely. The most distinctive indication, however, that this stage has declared itself, is the absence of pain in passing water. Painful erections and chordee may continue after the more acute inflammatory stage has subsided, as the plastic lymph previously thrown out is not immediately absorbed. This stage of the disease is of longer duration, as a general rule, than either of the others; and in some cases, unless the proper treatment be employed, will continue for months, and even years.

A spontaneous cure of gonorrhœa is rarely accomplished in less than three months, even in those possessing the most vigorous health.

The *severity* and *continuance* of gonorrhœa have no necessary relation. Thus, the disease is most severe in young and plethoric persons suffering from the first attacks; but is often of a most persistent character in scrofulous constitutions, especially if there be a previously-exhibited disposition to gout or rheumatism, and is always more serious after repeated attacks, frequently being chronic from the first.

The **constitutional disturbance** in gonorrhœa is rarely so great as to demand especial attention; though it varies much in different persons, and is materially modified by a variety of influences, such as diet, exposure to cold or wet, and by previously-existing diseases. In rare cases, however, there is considerable febrile excitement, marked by the usual symptoms of headache, full pulse, furred tongue, loss of appetite, and dry, harsh skin.

Treatment.—It is in the treatment of this disease that the two rival schools of medicine come into closer comparison; and it is a fact of every-day observation that in no other disease does the allopathic system of practice arrive so near the truth as in the treatment of this variety of diseases. All their principal medicines in the cure of venereal complaints are of that type of remedies styled *specifics*, or, in other words, homœopathic remedies. Thus, *mercury* is the universally-admitted specific for syphilis, and is used by practitioners of both systems; the only difference—and

that is of the greatest magnitude—is in the *amount* of the remedy prescribed. The same principle obtains in the use of copaiba, cubebs, and turpentine, the true specifics for gonorrhœa. The great difference, then, consists in this : that in the allopathic school, while they cure their patients, they inflict upon their systems poisonous effects which are sometimes more deleterious than the original disease. The homœopathist, on the contrary, cures his patients, but does not poison them or impose upon their constitutions the painful penalties of his remedies. In addition, the homœopathist possesses a greater variety of curative agents, which, from their pathogenesis, are *en rapport* with the various stages of the disease. Consequently he has additional and important remedies which the allopathist does not possess, or, if possessing, does not employ.

“If,” says Yeldman,* “a patient can make up his mind to swallow the monstrous doses of copaiba, etc., ordinarily prescribed, and his stomach will retain them, then he stands a chance of getting rid of an attack of gonorrhœa as speedily as any other system can rid him of it ; but if he prefer the small doses of cannabis, thuya, and mercurius, as administered by the homœopathist, then I boldly assert that he can get rid of his complaint as quickly as by any other means. I have tested both systems in almost innumerable instances ; and I say of the one, it will cure gonorrhœa, but it will cure it in a disgusting and sickening way : I say of the other, that it will also cure gonorrhœa as quickly and effectually, and without a shadow of medicinal annoyance. This is the alternative, and it is a most important one. Gonorrhœa is a disease that will not get well by magic. Under any system of treatment, cases will at times run on, become chronic, baffle our best-devised measures, and tax alike the endurance both of patient and surgeon. If, then, in the most successful cases, the pleasantness of the treatment is a matter of importance, how much more important is it when the patient may have to swallow medicine for weeks, possibly for months?” This is precisely the advantage that homœopathy possesses over its rival, not only in the treatment of the diseases in question, but all others ; the advantage to homœopathy being correspondingly more marked the further treatment is removed from the principle of similia.

*Homœopathy in Venereal Diseases, by Stephen Yeldham, M.R.C.S.

In conducting the treatment of gonorrhœa, reference must be made to the stage the disease has attained, and especially to the amount of inflammatory action accompanying it.

In the early period of the disease, or the stage of irritation, and before inflammation has set in, it has been proposed to adopt what is termed the *abortive* treatment. This method consists in injecting into the urethra a strong solution of the nitrate of silver, or of smearing a bougie with a strong ointment of that salt and applying it to the inflamed surface. During this stage, or the incubating period, as it is termed, when the disease is confined to the *fossa navicularis*, this practice may be curative and be productive of no serious mischief, provided the action of the remedy does not extend beyond the diseased surface. If it does not reach every portion involved in the morbid process, this treatment will be of little avail. Here the difficulty lies, and on this account the abortive treatment has to a great extent fallen into disrepute, and at the present time is not generally employed by surgeons.

In employing the abortive treatment, there are several conditions to be observed. 1. The disease should be limited to the anterior portion of the urethra, known as the *fossa navicularis*, and the injection should not reach beyond it. 2. The treatment, to be successful, demands that the whole diseased surface should receive a thorough application of the injection, for if any portion remains untouched it will secrete matter that will again light up the disease. 3. When once a sufficient degree of artificial inflammation is excited, the caustic has accomplished all that can be expected of it, and should be discontinued.

In using the nitrate of silver, the strength of the solution will depend upon the number of times it is intended to be employed. If only one injection is required, it should be of considerable strength: from five to ten grains of the salt in one ounce of distilled water. If it is intended to use it repeatedly and at short intervals, the plan which I have adopted, one grain of the nitrate, or two grains of zinc, to the ounce of distilled water, will make the solution of sufficient power to overcome the disease. In treating a case by this plan, it is absolutely imperative that the surgeon administer the injection himself, and not trust it to the patient. It is on account of this latter proceeding that the operation has so often failed and discredit been brought upon a valuable and important curative process. Be-

fore employing the injection, and for the purpose of cleaning out the urethra, as well as emptying the bladder and preventing decomposition of the fluid, the patient should be made to void his urine. The prepuce should now be retracted, the glans penis wiped dry, and the point of the syringe introduced within the meatus—the thumb and forefinger of the left hand applied to its opposite sides and firmly compressing the glans around its point. The injection may be thrown in cautiously, and be retained there a few seconds by maintaining the pressure around the glans. When the injection escapes, it will be of a pearly-white color, rendered so by a partial decomposition of the nitrate by the small quantity of urine and muco-pus remaining in the canal. When this is observed, a *second* injection should be used immediately, and retained for two or three minutes, the finger of the left hand being passed along the under surface of the penis *from behind forward*, so as to distend the portion of the canal occupied by the injection and in this manner insure a thorough application of fluid to the whole urethral surface. This description of the method of using the syringe is applicable to all injections that may be required in the treatment of gonorrhoea—the solution being thrown in, in all instances, as far as the inflammation has extended. After frequent use of the injection the discharge becomes copious and purulent, and considerable scalding is experienced. In twenty-four or thirty-six hours, however, it becomes thin and watery, and is perhaps *tinged with blood*. The injections should now be discontinued, and minute doses of copaiba or cannabis be given every four or six hours. Diluent drinks of flaxseed or gum arabic will be exceedingly serviceable in correcting the irritating properties of the urine and exercising a soothing influence over the inflamed surface. Dr. Diday, of Lyons, uses a single injection of a strong solution of nitrate of silver. Dr. F. Campbell Stewart, of New York city, uses an instrument inclosing a sponge dipped in a solution of nitrate of silver and concealed within a canula. This is introduced within the urethra for about two inches, and then gradually withdrawn by twisting it on its long axis. The advantage of this instrument is, that all the diseased surface may be touched by the caustic without endangering the tissues lying beyond.

After this period has passed by, and the acute inflammatory stage has set in, attended by heat, swelling of the penis, ardor

urinæ, frequent desire to void water, with an abundant mucopurulent discharge, the treatment must be directed to the subsidence of the inflammation; and the activity of the measures must be proportioned to the intensity of the existing phenomena. If this be of a severe character, a warm hip-bath will be of benefit, or the envelopment of the penis in aconite dressings will be found of essential service. If the bowels have been constipated, an injection of molasses and water, or common soap-suds, will exercise a salutary influence in counteracting the violence of the inflammation. The constitutional treatment in this stage will be best met by the internal administration of

Aconite.—This remedy is indispensable in the treatment of acute gonorrhœa. In the early stages of the disease, when the inflammatory symptoms are being rapidly developed, when the scalding is severe, the discharge copious, the erections at night frequent and painful and attended with chordee, with more or less febrile symptoms, then aconite, in two-or-three-drop doses of the second or third dilution, will produce most marked effects, and change the whole character of the disease. At the same time the urine may be diluted and its irritating properties lessened by the patient drinking freely of gum-arabic, flaxseed, or barley water. All stimulants should be avoided, the diet restricted to the blandest nourishment, and, if possible, perfect rest enjoined. After the inflammatory action has been subdued, one or more of the following remedies may be used, according to their pathogeneses, viz: *Mercurius corrosivus*, *cannabis*, *cantharis*, *copaiba*, *thuya*.

Mercurius corrosivus.—This is one of the most reliable remedies, in the early stages of the disease, and should be employed either in alternation with aconite or after the violence of the inflammation has been overcome by the last-named remedy. To be productive of real benefit, it should be given in the second or third trituration,* and in doses of three or four grains. These two remedies (*aconite* and *mercurius corrosivus*) will seldom fail in overcoming the more violent symptoms of the disease. So long as they act beneficially they should be continued, and other remedies only substituted when these seem to have lost their good effect. Other preparations of mercury have been recommended, but a long

* In speaking of triturations, the *decimal* is always understood.

experience leads me to place more reliance on this form than any of the others. In those cases where chancre is combined with gonorrhœa, *mercurius solubilis* may be given with decided advantage; but in a pure and uncomplicated form of gonorrhœa, I have never seen any decided curative results following the use of this preparation of mercury.

Cantharis.—This is a remedy peculiarly applicable to the sub-acute inflammatory stage; and from its wide range of action upon the whole urinary tract, from the kidney to the urethra, it is especially curative in those cases where a large extent of membrane is involved in the morbid process; where the irritation extends from the orifice of the urethra to the bladder, scalding and burning along the passage, with frequent and painful micturition. It may be necessary to alternate it with aconite, as recommended under the head of *Mercurius*, but should not be too frequently repeated, nor used in a lower dilution than the third. The dose is from one to three drops every six or eight hours—the aconite, if used in alternation, being given during the interval.

Cannabis sativa is appropriate when the more active inflammatory symptoms have been subdued by the foregoing remedies, and when there still remains considerable irritation in passing water, with more or less swelling and redness of the urethral orifice, accompanied by a discharge thinner and whiter than that which attends the inflammatory stage. In this or the sub-acute stage its action is often prompt and decisive, and always satisfactory. It occupies the same position in the homœopathic school that *copaiba* does in the allopathic; but, unlike the latter, is free from any of its inconveniences. To be of any service it should be given in appreciable doses—that is to say, from five to ten drops of the tincture four or five times a day. It may be alternated with either *mercurius* or *cantharis* whenever the symptoms demand the use of either of these remedies.

Copaiba is a powerful homœopathic remedy in those stages of gonorrhœa where the inflammatory symptoms have been mitigated by previous treatment. “Like cannabis,” says Yeldham, “it requires to be administered freely; but unlike that medicine, it is so objectionable in taste and smell, and in its effects upon the stomach, as to be often more intolerable to the patient than the disease it is given to cure. To obviate this difficulty, capsules of

various kinds have been invented; and, as they answer the purpose of hiding the taste and odor of the drug, they present the best form in which it can be exhibited when that medicine is deemed necessary. To be of benefit it should be given in palpable doses, and capsules present the best form for administration." It is of little service when given in attenuation. The remedy seems to act by being taken into the circulation and mixing with the urine, and, coming directly in contact with the diseased membrane, locally cures the disease; hence the necessity for appreciable doses. On this point, Ricord says: "We have had occasion to treat gonorrhœa in patients who suffered under urethral fistula at two inches or two and a half inches from the meatus. In one of these cases, blennorrhagia occurred in the vesical portion of the canal, but it spread itself forward to the balanic region. The use of copaiba caused the disappearance of the discharge in that portion of the urethra situated behind the fistula, viz: that which was under the influence of the urine. But the discharge from the portion anterior to the fistula—viz: that portion of the canal which did not come in contact with the urine—persisted. Injections caused its disappearance. Another patient, affected with a fistula in the same region, was able to make water through the meatus by lowering the penis so as to bring the edges of the fistula in contact; but, on raising the organ, the fistula became open and allowed the passage of all the fluid. The patient came under my care on account of a blennorrhagia, which occupied the whole length of the urethra; and without any injury to him, we profited by his affection to clear up our doubts on the mode of action of copaiba. After giving him copaiba, we desired him to evacuate the whole of the urine by the fistula. At the end of some days the discharge from that portion of the canal placed behind the fistula had disappeared, but it continued in the portion in front of the fistula. The use of copaiba was continued and the patient desired to allow the water to pass all along the canal as he made water—in fact by the meatus: the discharge from the spongy portion of the urethra disappeared like the other."

These experiments prove the homœopathicity of copaiba to urethritis when applied directly to the inflamed surface. It is a remedy almost universally had recourse to in allopathic practice in this stage of gonorrhœa; and its efficacy depends upon the principle of similia as applied to this class of diseases.

Cubeba.—This remedy has a marked affinity for sub-acute inflammations of the genito-urinary apparatus. Dr. L. de l'arreal* thus explains its action by the following symptoms: "It exercises a specific action on the genito-urinary apparatus, producing an inflammation or phlogosis of the urethra, bladder, and testicles, with ardent fever, ardor urinæ, redness of the face, retention of urine, cutaneous eruptions." MM. Trousseau and Pidoux remark that cubeba has become exceedingly popular in the treatment of gonorrhœa in this stage, "which, rationally, this agent must greatly exaggerate." Observation teaches that cubeba acts *more* beneficially the sooner its employment is instituted after the beginning of the blennorrhagia. In relaxed constitutions, and more particularly after frequent claps, this remedy will be found more efficacious than copaiba. An excellent plan of administering this drug is to rub up about half an ounce of the powdered cubebs with a sufficient quantity of honey to make a stiff paste, of which the patient may take a piece about the size of a pea three or four times a day. The effects of this electuary are often remarkably beneficial; but it can only be used in the constitutions indicated, and then should be given only when the more active inflammatory symptoms have been mitigated by the previous-named remedies.

The foregoing are the remedies which, in the vast majority of cases, may be relied upon as strictly curative in the treatment of this disease, and it will seldom be necessary to seek additional aid. Yet there are exceptional cases in which these remedies do not seem competent to guide the disease to a favorable termination; and from the prominence of this or that symptom, other medicines are called into requisition to complete the cure. When the constitution possesses a psoric taint, in intractable cases, *sulphur* may be relied upon; a few doses of this remedy at night, given in the higher alternations, will often be productive of marked benefit.

Capsicum.—When the burning along the urethra is intense, the discharge being whitish and purulent, accompanied with ardor urinæ in voiding water.

Aux Vomica.—When the digestive apparatus is disturbed, the irritation extending to the rectum, causing frequent and distressing urging to stool, with accompanying hæmorrhoids.

* Bulletin de la Société Médicale, 1860.

Other remedies may be consulted, according to their respective pathogeneses, among which may be mentioned as the most important, agnus castus, petroselinum, tussilago petasites, ferrum, iodide of potash, and thuya.

Injections.—It is during the second stage of gonorrhœa that injections may be advantageously used. An unfounded prejudice against these agents has occupied the minds of some of the profession, and great efforts have been made to expunge them from the list of curative agents in this disease. The formation of stricture has been referred to their use; but a more careful observation teaches us that this complication of gonorrhœa is more often due to the long continuance and severity of the disease itself than to its more rapid cure by the employment of injections. “It is in long-standing cases of gonorrhœa,” says Erichsen, “in which the discharge continues for months or years, that stricture results—not in cases of ordinary duration; and in these it is the result of the chronic inflammatory thickening of the mucous membrane, and has no more to do with the injections than with the copaiba the patient may have taken.” The objections raised against the use of injections are:

1. It is contended that the fluid injected into the urethra carries before it the muco-pus lying in the canal, and thus extends the disease to the deeper portions of the urethra. This, if true, will be avoided by the direction given heretofore, that the patient pass his urine before using the injection.

2. It is claimed that injections give rise to swelled testicle and other complications of gonorrhœa. This is only possible in those cases where the injections are used too strong, a practice which the author entirely reprobates.

3. It is supposed that injections penetrating the bladder do harm, but this idea is exploded by the fact that it is impossible to inject the bladder, however great the amount of force employed, by means of a syringe merely introduced within the meatus.

As the inflammation and ardor urinæ subside under the use of the preceding remedies, emollient and slightly-escharotic injections may be employed. Among these may be mentioned the acetate of lead in tepid water, the strength of two grains to the ounce. The chloride of zinc, sulphate of zinc, nitrate of silver, corrosive sublimate, sulphate of copper, chlorate of potash, hydrastis canadensis, iodine,

and calendula, have been employed by various practitioners with decided beneficial results. These agents may be used in various degrees of strength, from half a grain to five or six to the ounce of water, according to circumstances. My own plan is to employ them weak, and order the injection to be used after each passage of the urine, which will amount to five or six, or more, in the course of the twenty-four hours. The preparations of hydrastis and calendula are to be employed in the form of infusion—that is to say, about one dram of the freshly-powdered root of hydrastis to six ounces of boiling water, and used when cold; an equal amount of calendula in tincture may be mixed with the same quantity of water and used as recommended.

Dr. Irwin, a surgeon in the army, uses no other remedy in urethral inflammation than chlorate of potash. His method of using it is as follows: One dram of the salt dissolved in eight ounces of water, of which an injection is given every hour for twelve hours. At the end of this time the discharge has become changed and diminished—allowing the remedy to be gradually discontinued until the second or third day, when the disease will be generally found to have ceased.

During the whole of this stage the diet and habits of life must be carefully regulated and all stimulants interdicted. As soon as the discharge has ceased, the injections should be either entirely discontinued or kept up at longer intervals, the strength of the injection being correspondingly weakened.

“In giving directions,” says Bumstead, “as to the regimen of a patient in this stage of gonorrhœa, some regard should be paid to his usual mode of life. As a general rule, all indulgence in spirituous or malt liquors should be strictly forbidden, and total abstinence be practiced until the cure is complete, and for at least a fortnight afterward. You will meet with some patients, however, who have been free drinkers for years, and who will not well bear the total loss of their stimulus without becoming so debilitated that their gonorrhœa is thereby prolonged and more difficult to cure. In these *exceptional* cases it is better to allow a glass of claret, sherry, or even brandy and water, to be taken with the dinner. In any case, malt liquors should be avoided, since they are decidedly more injurious than other liquors which contain a larger amount of alcohol. The patient may now return to a more generous

but simple diet; though salt meats, highly-seasoned food, asparagus, and cheese, should still be avoided. The bowels are not to be allowed to become constipated; and this should be prevented so far as possible by regulating the diet. One or two free stools a day are desirable. If the patient has been confined to the house during the acute stage, he may now be allowed to go out, but should be cautioned against walking or standing more than necessary; and *the genital organs should be well supported by a suspensory bandage*. Patients often inquire whether the use of tobacco is injurious. I believe that it is, and that either smoking or chewing, especially in excess, relaxes the genital organs and tends to keep up a urethral discharge. I have frequently been told by patients subject to spermatorrhœa that smoking during the evening would invariably be followed by an emission during the night; and I am satisfied that many cases of gonorrhœa are prolonged by the excessive use of tobacco. I therefore recommend entire abstinence, or at least great moderation, both in smoking and chewing, to persons suffering from this disease.”*

SECTION II.

COMPLICATIONS OF GONORRHOEA.

§ 1.—Gleet.

By the term *gleet* is understood “a slight and chronic discharge from the male urethra, unattended by symptoms of acute inflammation.” It is usually the result of improper treatment of patients laboring under an attack of gonorrhœa, and so nearly resembles the chronic stage of this disease that it is not possible to determine when the latter merges into the former. The discharge peculiar to gleet is variable in its character, quantity, and time of appearance, and is usually the only symptom by which its existence is known, as there is generally no pain, redness, or tumefaction of the lips of the meatus, and no unpleasantness in passing water. This discharge is slightly viscid and usually perfectly transparent, and in

*Dr. Shipley has recently published two cases of gonorrhœa in which the discharge repeatedly disappeared on leaving off smoking and returned on resuming it.—*Boston Medical and Surgical Journal*.

the great majority of cases is observed only in the morning on rising. It may, however, appear in the urine or during defecation, especially if inflammation of the prostate be its source. In other cases the discharge is constant, or nearly so, and of sufficient quantity to stain the linen. It is exceedingly liable to be aggravated by any causes capable of producing irritation of the genital organs, such as alcoholic stimulants, violent exercise, horseback-riding, free sexual intercourse, or exposure to sudden changes of temperature, hearty food, and the like ; and hence may readily become purulent, or, in other words, transferred into a veritable gonorrhœa.

The question of the contagious character of gleet has elicited no little discussion at different times ; and notwithstanding the *danger to be incurred by sexual congress during the existence of a discharge*, as pointed out by the evidence afforded by the ablest writers, it is still taught in many standard works that "gleet is perfectly innocent with respect to infection." It is quite possible, however, that cases of gleet exist in which the discharge is of an innocuous character, but it is wholly impossible to determine, without the benefit of actual experiment, when the fluid loses its purulent property ; and if innocent, it is equally impossible to say in how short time it may, by error in diet, sexual indulgence, etc., become highly contagious.

Treatment.—The treatment of gleet should be addressed to the general condition of the patient as well as to the local disease. In all cases of gleet it may be laid down as a general rule that the constitutional vigor of the patient is more or less prostrated ; not that all patients who are suffering with gleet are necessarily weak and emaciated, but to a certain degree their systems are more or less impaired. This will be shown by their inability to undergo fatigue as formerly ; they are conscious of having lost a portion of their animal vigor ; and the benefit to be derived from a well-regulated diet and hygienic measures is indeed apparent. Here much depends not only on the administration of proper remedies, but a careful regulation of diet and the habits of life. It will constantly appear that—after the disease has been apparently cured by well-timed remedies—excesses at the table, and more especially the drinking of beer, effervescing or acidulated wines, will bring back the discharge. This is also true after sexual intercourse, though the discharge may have entirely ceased before the connection. It

is especially the case in those constitutions that are either strumous, gouty, or rheumatic, and in which all urethral inflammations are with difficulty removed.

The constitutional treatment consists in the administration of those remedies that quiet irritation and restore the vigor of the genito-urinary apparatus. The most appropriate medicines for effecting this purpose are, *nux vomica*, *pulsatilla*, *ferrum*, *cantharis*, *mercurius*, *cubeba*, *secale*, and *sulphur*. Besides these, the practitioner has access to all the variety of remedies for the cure of defective constitutional organizations, to be used according to their respective pathogeneses. The selection of the remedy must, in all instances, be determined by the constitutional as well as local symptoms, always remembering that gleet is associated with a depressed condition of the physical powers. Yeldham recommends *nux vomica* and *sulphur*, remedies which, in his hands, have been productive of the utmost service. He says: "I have frequently witnessed the entire disappearance of the discharge under the steady use of these two remedies. In cases where mercury has been deemed necessary, *cinnabar* is the most useful preparation." *Pulsatilla* is an excellent remedy in chronic affections of the urinary organs, and is especially adapted to phlegmatic and scrofulous constitutions. The various forms of the ferruginous preparations are often highly efficacious. I have frequently used the muriated tincture of iron in gleet occurring in weak, debilitated systems, in five-drop doses three times a day, with remarkable benefit. In selecting the appropriate remedy, it is recommended that it be continued perseveringly for days, and even weeks, and only substituted for another when all evidences of its curability are either nugatory or of little value. In all cases it is desirable to combine with medical treatment the invigorating influences of local and general bathing, due attention to diet, and change of climate.

In such cases, besides the constitutional invigorating medicines, much benefit will be derived from the use of local applications. Among these I have found none more serviceable than an infusion of *hydrastis canadensis*. An infusion may be made by saturating an ounce of the root with a pint of boiling water, thrown into the urethra every night and morning, and afterward oftener if the effect is satisfactory. In some cases the nitrate-of-silver injections of the strength of one half a grain, or the corrosive sublimate in

the proportion of a quarter of a grain to the ounce, will be serviceable. In most instances it is beneficial to change the injections from time to time, the mucous membrane appearing to get accustomed to the same stimulants, and thus not being impressed by it in a proper manner.

After the gleet has continued for some months, much benefit will be derived by the introduction of a full-sized metallic bougie every second or third day. The instrument should be left in for the space of ten or fifteen minutes, and should be of the largest size the urethra will admit. The beneficial results of this treatment are no doubt due to the good effects produced by the bougie upon the gradually-increasing stricture, the discharge being a consequence of the morbid process set up in the urethra, which in time develops the organic stricture.

In debilitated, anæmic constitutions, much good will oftentimes be effected by a mixture of five or ten drops of the tincture ferri sesquichloride in an ounce of rain-water, the injection to be thrown into the urethra several times a day. The pyrophosphate of iron may be also given internally, in the second or third decimal trituration, with the greatest benefit.

The tincture of cantharides has been much praised by Bumstead* in gleet. He says: "Experience has shown that this drug exhibits a decidedly curative action in many cases of gleet, and in gonorrhœa also in the chronic stage. It is a favorite remedy with the homœopaths, in doses of a drop of the tincture every few hours, in the acute stage of clap, and is considered by them to be indicated by scalding in micturition, chordee, and a greenish or bloody discharge."

I have made some brilliant cures of gleet, or rather of chronic clap, by the internal administration of iodide of potassium, third trituration, every four or five hours. Usually upon the second day the discharge diminishes, and in four or five days longer disappears entirely. It is appropriate to patients of a strumous diathesis, but is interdicted by allopathic authority on the ground that it "increases the discharge from the urethra." Dr. Bumstead says: "I have found that the iodide of potassium has a tendency to increase the discharge from the urethra, as it often does the secretion from

* The Pathology and Treatment of Venereal Diseases, by F. J. Bumstead.

other mucous membranes; and I do not therefore administer it. This effect of the iodide may frequently be observed when we are giving it for tertiary syphilis to patients who at the same time are affected with gleet."

In addition to the injections recommended under the head of gonorrhœa, the following may be added:

- ℞.—Corrosive sublimate, gr. i;
Aqua rosæ, ℥viiij to xii. M.
- ℞.—Gallæ, ℥i;
Aquæ, ℥viiij. M.
- ℞.—Acid nitric, gtt. vi to xij;
Aquæ, ℥viiij. M.
- ℞.—Liquor ferri persulphatis, ℥ss;
Aquæ, ℥vi. M.
- ℞.—Tinct. iodine, gtt. viij;
Aquæ, ℥xvi. M.
- ℞.—Ferri iodide, grs. viij;
Aquæ, ℥viiij. M.

Bougies.—In all cases of gleet the urethra should be carefully examined with a full-sized bougie, in order to detect the presence of stricture; and if the slightest contraction be discovered, it should immediately engage the attention of the surgeon. For it is observed that chronic thickening of the lining membrane of the urethra, in some cases amounting to stricture, in others to a mere induration and irregularity of the canal, is a prolific cause of gleet. The restoration of the passage to its normal size by an occasional introduction of the bougie will of itself often, without any other treatment, quickly cure the discharge. When it is found, therefore, that the remedies administered internally are not curative of this discharge, recourse should be had to the bougie for the purpose of exploration of the urethra. "It may be," says Yeldham, "that no well-defined stricture will be detected, but only a halting in the progress of the instrument, as if passing over some irregularities. These cases, equally with completely-formed stricture, yield to the use of the bougie." The length of time required to effect a cure by means of bougies varies in different individuals. In some cases the disappearance of the discharge takes place in a week or ten days, and in others a longer time is required to effect a cure. A case of gleet of four years' standing is mentioned by Bumstead,

“ which was treated with the tincture of the chloride of iron internally, and the introduction of bougies every second day,” in which a cure was effected in two weeks. In another case—a gleet of nine months—the discharge disappeared in three weeks, under the use of the same means. It is sufficient to introduce the instrument every second or third day and permit it to remain ten or fifteen minutes, according to constitutional peculiarities. If the bougie is introduced too often, unpleasant results may occur and the cure be retarded.

The *regimen* of patients suffering from gleet should be plain, but substantial, consisting of fresh meat, eggs, vegetables, etc.—all highly-seasoned and indigestible substances being strictly prohibited. In regard to exercise, it should be begun with moderation, and gradually and persistently increased in proportion to the strength of the patient. Healthy exercise of the mind is no less beneficial than that of the body. The attention of the patient should be distracted as much as possible from his disease by a resort to light reading, amusements, etc., or by any of those agents that have a tendency to make him forget his infirmity. Strict injunctions should be given to eschew entirely all associations calculated to excite the passions.

§ 2.—Epididymitis.

Synonyms.—Epididymitis is known by the terms *hernia*, *humoralis*, and *orchitis*, but more commonly as *swelled testicle*. The inflammation may, however, be confined to either the testicle or epididymis, or may implicate them both.

Etiology.—Epididymitis, though generally originating from an attack of gonorrhœa, is occasionally produced by other causes, as the passage of instruments, the lodgment of calculi, and by a blow; or it may result from exposure to cold, or from violent exercise.

Symptoms.—When occasioned by an attack of gonorrhœa, the patient observes, about the third or fifth week, a diminution or a complete cessation of the urethral discharge, at the same time noticing a slight sensation of weight and tenderness in the line of the cord, which soon becomes painful and swollen, thus indicating the extension of the inflammatory action along the vas deferens. Swelling of the epididymis rapidly follows, often becoming sufficiently enlarged to cover the whole testicle; the skin becomes tense

and occasionally of a dark-red or almost purplish hue; the least pressure produces intense pain, and the patient is obliged to keep perfectly quiet in a horizontal posture, with his genital organs properly supported. During the progress of the inflammation, effusion into the tunica-vaginalis testis is liable to occur and produce true hydrocele.

The most severe cases, however, do not necessarily result from gonorrhœa, but may be due to external violence. Thus, Bumstead mentions a case resulting from the forcible introduction of a large bougie, which proved one of the most serious that came under his observation. It not unfrequently happens that the epididymis continues hardened and somewhat enlarged for a considerable period after the subsidence of the inflammation, owing to the effusion of plastic matter into it, and implicating a part or the whole of its convolutions.

The constitutional disturbance is indicated by an increase in the circulation; the pulse becomes more frequent and full, the skin hard and dry, tongue furred, with perhaps headache and loss of appetite. Many cases, however, are not so severe as to occasion any very marked febrile reaction.

When the inflammation is at its height, the appearance of the swelling seems to indicate the enlargement of the body of the testicle, which is really not so. The swelling is composed for the most part of the enlarged epididymis, and an effusion into the tunica-vaginalis with a consequent œdema of the subscrotal cellular tissue. In some cases distinct fluctuation may be detected, but the tumor is rarely, if ever, transparent; on touching it gently, the surface yields to the pressure, until the force comes in contact with the firm structure of the testicle beneath. This yielding is due to displacement of the œdema in the tissues and of the fluid in the sac.

After the more active symptoms have been controlled by appropriate medication, the tumor begins gradually to resolve itself, beginning on the anterior surface of the scrotum, and continuing until nothing is felt but the hard, swollen epididymis behind, the body of the testicle in front preserving its normal elasticity.

In persons of a weak, lax habit, the disease is apt to assume the chronic form, the least exciting cause kindling anew the inflamma-

tion and predisposing to abscesses, either in the cellular tissue underlying the scrotum, in the epididymis, or body of the testicle.

Mr. Edwards* relates a case in which the entire testicle protruded through an opening caused by an abscess in the scrotum, the skin being drawn in around the orifice; "for the relief of which," he says, "I pared the edges, drew them asunder, making with the handle of the scalpel a sufficient separation of the deeper tissues, and the testicle was at once drawn, as it were, back into the scrotum, the wound closing over it. Three hair-pins were inserted; the wound closed by first intention, and the patient was walking about perfectly well on the seventh day."

If the abscess be not evacuated, the pus burrows in different directions, sinuses are formed, destroying to a greater or less extent the parenchyma of the testicle, but, singular to say, without any disturbance of its function.

Frequent attacks of the disease lead to hypertrophy of the organ and subsequent impairment of its functions; and where both testicles become frequently involved in the inflammatory process, impotency is almost sure to follow.

The theory that swelled testicle is caused by metastasis of the urethritic inflammation in its earlier stages, is not borne out by facts. "It is true," says Bumstead, "that, as a general rule, urethritis has passed the acute stage, and that the discharge has consequently diminished before the epididymis becomes inflamed; but this is the natural course of the disease when no complication whatever takes place. To prove a metastatic origin of the epididymitis, it would be necessary to show that there is a sudden disappearance or diminution of the running just preceding the swelling of the testicle. Such, however, does not occur. On the contrary, an exacerbation of the urethral disease and a slight increase of the discharge occurs a day or two previous to the metastatic inflammation of the testis. When the disease of the testicle is fairly established, decrease in the urethritic discharge takes place. These phenomena are frequently seen in other parts of the body, where acute inflammation is established."

An interesting question here presents itself in reference to those cases in which epididymitis has occurred on both sides, terminating

* Edinburgh Medical Journal, Nov. 1860, p. 455.

in obstruction and induration of its parenchyma, as to whether the patient still retains his sexual desires and his ability for procreation.

Dr. L. Gosselin* has made some interesting experiments upon the lower animals, as well as given us the results of his hospital and private practice in nineteen cases of double epididymitis, in all of which induration of the lower portion of the epididymis occurred. In no case was there any apparent change in the volume of the testes, nor was any pain felt during sexual intercourse or in the interval. No change in their sexual desires or powers was observed, and all were capable of coitus as the most healthy individuals. Their erections and ejaculations were complete; the semen normal in quantity, color, odor, and consistency, presenting the chemical reactions characteristic of sperm as described by Berzelius. But when examined by the microscope it was found *entirely destitute of spermatozoa*. This entire absence of spermatozoa was subsequently confirmed, upon repeated examinations, by Drs. Gosselin, Robin, and Verneuil, and other eminent Parisian microscopists. In two of these cases, says the same writer, treatment was continued in the one case for three months, and in the other for nine, which resulted in the disappearance of the induration in one of the testicles, and, coincidentally with this resolution, spermatozoa again appeared in the semen, as shown by microscopical examination.

M. Godard states that he has confirmed these observations of Gosselin by microscopical examination of the semen in thirty persons affected with double chronic epididymitis, and in every case spermatozoa were absent. If gonorrhœal epididymitis attack a testicle which has been arrested in its descent from the abdomen to the scrotum, a false diagnosis may occur, as it simulates to a certain degree either bubo or strangulated hernia. If the testis is still within the abdomen, it may be mistaken for peritonitis, or iliac abscess.

Two interesting cases are mentioned by John Hunter, showing the abnormal position of the testicle in the perinæum. Speaking of one, he says: "Many years ago a little boy, one of whose testicles had thus deviated from its proper course, was brought to the London Hospital. The gland was lodged in the perinæum at the foot of the scrotum." Ricord and Vidal† (de Cassis) have also seen two

* Archives Générales de Médecine, Sept. 1853.

† Curling, op. cit. p. 46.

cases of this kind. M. Ledwich* discovered an abnormality of this character in the dissecting room, and M. Godard gives a history of another, with an illustrative drawing. These, so far as I am enabled to discover, complete the number of such cases, and, indeed, they present many interesting points of diagnosis to the practicing surgeon.

"There is another consideration connected with abnormal position of the testicle," says Bumstead, "that is worthy of mention. In most cases of this anomaly, the gland is useless for the purposes of procreation, as, according to Follin and Goubaux, it undergoes fibrous or fatty degeneration. Godard denies this, but shows by microscopical examination that the gland, as a general rule, is impotent, no spermatozoa being discovered after death. In eight cases out of nine, spermatozoa were wanting. Now, if the anomaly be confined to one side, and the opposite testicle be in a healthy condition, fecundation is still possible; but, if the descended testicle be attacked by epididymitis, obliteration of its vas deferens will deprive the patient of all procreative power, as in the cases of double epididymitis observed by Gosselin." Godard mentions the case of a man with an undescended testicle, who had a child by a mistress, but who, after an attack of acute epididymitis on the opposite side, was not competent to beget offspring during two subsequent marriages; his semen twenty-one years afterwards was found destitute of spermatozoa.

Pathology.—As post-mortem examinations of uncomplicated epididymitis are extremely rare, few opportunities are presented to investigate the lesions that occur from inflammation of this organ. Dr. Velpeau has given us the details of an examination in a case, with all the light which modern science affords, and, it being the only one on record, his observations are extremely valuable.

Case.—The patient entered hospital with swelled testicle of eight days' duration; the epididymis was situated in front of the testicle, was swollen and hard; the cord was also involved, while the body of the organ appeared sound, and there was no effusion in the tunica-vaginalis. Eighteen days afterward the patient died of cholera, and the post-mortem revealed the following: 1. The tunica-vaginalis contained no fluid, and was free from injection of its vessels. 2. The parenchyma of the testicle was normal in appearance.

* Dublin Quart. Jour. of Med. Sci., Feb. 1855.

3. The globus major and the body of the epididymis were also healthy; but the globus minor was swollen, and formed a hard, uniform mass, the size of a haricot bean. On cutting into this mass, it was found to be destitute of blood-vessels, of a uniform yellow color, of a firm consistency, and resembling tubercle. The sections of the convoluted spermatic duct upon the cut surface showed that this vessel had attained three or four times its normal size, and, instead of being hollow, that it *was filled with uniform yellow matter; there was none of this matter between the convoluted vessels; it was entirely within and in the substance of the walls.* This matter, subjected to the use of the microscope by M. Robin, was found to contain pus-globules, mixed with fat-globules, and the granular-globules of inflammation. He also confirmed the statement that this matter was limited to the interior of the vessels.

4. The vas deferens, which had recovered its normal size, was filled with yellowish matter, containing no spermatozoa, and composed of pus-globules, cylindrical epithelial cells, and granular corpuscles. The appearance of its walls was perfectly normal.

5. The vesicular seminalis on the affected side was healthy. It contained a small amount of fluid, with pus-globules and epithelial cells, but no spermatozoa, but they were found in the vesicular seminalis of the opposite side. The pathological changes produced in the epididymis no doubt differ in different cases, depending upon the *length of time* it had existed and the *degree* of inflammatory action; in chronic cases, the masses of induration existing for months and years, the anatomical elements are so confounded that it is impossible to distinguish them.

Treatment.—The treatment of inflammation of the testis, under proper homœopathic remedies, presents the most surprising and satisfactory results of any disease in the range of medical practice. “It is difficult,” says Yeldham, “for the medical man who understands the nature, intensity, and obstinacy of the disease, to credit the effects of these remedies without witnessing them. They are more striking when received in contrast with the treatment of the old regime. The indications presented in conducting an inflammation of this organ are—*first*, to employ those agents *locally* which exercise a curative agency over the disease; *second*, to administer internally those remedies which, from their well-known action, are *en rapport* with the diseased condition. These are,

aconite, aurum, pulsatilla, belladonna, mercurius, clematis, hamamelis, etc.

Aconite is indicated in the formative stage, as soon as the symptoms first point to the existence of the disease, and should be continued for twenty-four or thirty-six hours, or until the inflammation is subdued. In a majority of cases this remedy alone has often effected a cure. If the disease does not yield entirely, it will be so mitigated by the remedy as to place it under the control of

Pulsatilla.—This remedy may be used either alone or in alternation with the preceding remedy, according to indications. If the symptoms are mitigated, but not entirely subdued, by *aconite*, when given at the onset, and the disease seems to be persistent, *pulsatilla* should be alternated with *aconite*, and continued until all traces of the disease have passed away, being careful in all cases to lengthen the interval between the doses as convalescence proceeds. "I have rarely found it necessary," says Yeldham, "to resort to any other than the two remedies, viz: *aconite* and *pulsatilla*; yet it might be anticipated some peculiarity of constitution, or other circumstance, will occasionally modify a case in a manner to demand a modification of treatment. Thus, I have treated cases in which, *aconite* and *pulsatilla* failing to subdue the excessive pain of the testicle, almost immediate relief has been obtained from the use of *belladonna*; and others, of a very aggravated nature, in which *aurum* was of the most essential service."

Belladonna.—The symptoms which demand the use of this drug are mostly observed in those constitutions in which great sensibility of the nervous system exists, accompanied with severe and lancinating pains partaking of the neuralgic character.

Aurum is especially indicated in those cases where the cord is more prominently affected than the testicle. The pains are more continuous and distressing than lancinating, and accompanied by an enlargement of the cord, especially in the neighborhood of the external ring, where it may be felt two or three times larger than its natural size. External or topical lotions in this condition will be of great service, as they are indeed markedly beneficial in all stages of inflammation of the testicle or its appendages.

Clematis.—This remedy has been employed in the treatment of this disease by Dr. Hirschel, who regards it a valuable agent where

"orchitis supervenes on exposure to cold, after a blennorrhœa; the testicle becoming indurated, sensitive to pressure; the scrotum red, swollen, with tearing, drawing pains, with retraction of the spermatic cord."* Rucker^t gives the following indications for the employment of the remedy, viz: "Painful induration, with sensation as though grains of sand were disseminated upon the surface of the organ—sequence of ill-treated blennorrhagia." Drs. Marcy and Hunt give the following cases treated by this remedy, with the results: "In a case after exposure to cold and damp, a blennorrhagia was accompanied with violent pains in both testicles; nocturnal aggravation, with fever; testicles hard, swollen, and highly sensitive to pressure; scrotum red and tense; discharge nearly suspended: *clematis*, 12°, two doses in three days. The symptoms subsided during the interval, and the discharge reappeared. The swelling of the epididymis continuing, *aurum*, 12°, completed the cure. In another case—in which, from fatigue in hunting, a blennorrhagia was succeeded by orchitis, with phymosis; the scrotum red and tense, as in hernia; fever intense, with furious delirium—after aconite, *clematis* completed the cure." Various indurations of the testicle and of the cord have been successfully treated by this remedy. When epididymitis is occasioned by metastatic inflammation caused by cold, *rhus.*, *bell.*, and *bryonia*, are also reliable remedies.

Hamamelis, both internally and externally, has been found, in my hands, a remedy of great curative power in controlling the diseased action attending epididymitis, especially in those cases where the disease partakes of a congestive or sub-acute character rather than the inflammatory.

Tartar emetic is highly beneficial in this disease when conjoined with gastric symptoms, as furred tongue, bad taste, eructations, constipation, want of appetite, etc. "When orchitis is very severe," say Marcy and Hunt, "*tartar emetic* has often a marked effect in reducing the inflammation and relieving the pain."

Mercurius is of great value in chronic swelling of the gland after inflammatory action has passed away, the swelling left behind being a temporary effect of the pre-existing inflammation.

Dr. Hornby, of Poughkeepsie, N. Y., reports a case of epididymitis, accompanied by engorgement of the vas deferens of the left

* Marcy and Hunt, *Homœopathic Practice of Medicine*, p. 384.

testicle, of two years' standing, with shooting pains in the inguina. After various remedies had been ineffectually administered, *spongia tost.*, 200°, effected a cure in one month. Another report of a case of this disease, complicated with phthisis trachealis, has been furnished by the same author, cured by the same remedy and potency.*

Dr. T. S. Hoyne, of Chicago, reports a case of epididymitis from suppressed gonorrhœa, which yielded readily to *puls.*, 3°, internally, and *arnica* diluted one-half with water as a local application. This remedy should never be overlooked when the disease results from injury.

Sulphur should be given when the swelling of the gland is kept up by some latent poison in the system dependent upon a strumous or scrofulous constitution. Other remedies of value present themselves in the complications that sometimes arise during the progress of the disease, which should be selected according to existing derangement.

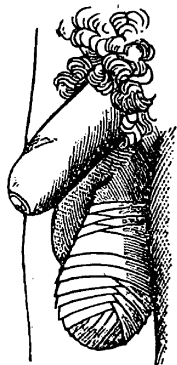
The *local remedies* consist in the application of *aconite*, *arnica*, and *belladonna* lotions to the inflamed organ, according to the character and progress of the diseased action. In the beginning of the inflammation, when of a sthenic type, *aconite* is always to be considered; when of a congestive character, or after the more violent symptoms have been subdued, *belladonna* dressings should be substituted; and *arnica* when the swelling proceeds from an injury or violence done the organ. The patient should be kept in bed with the testicle raised on a small pillow between the thighs, and the lotions recommended applied diligently. The temperature of the dressings should be that which is the most grateful to the patient's feelings; as a general thing, however, *warm* applications are the most beneficial. If effusion takes place into the tunica-vaginalis, constituting acute hydrocele, relief will be promptly afforded by puncturing the sac with the point of a lancet.

Strapping of the testicle, first suggested by Dr. Fricke, of Hamburg, is often beneficial in chronic cases when the testicle remains indurated and enlarged, after the inflammation has been reduced and the parts will bear handling. It should not be employed until the acute symptoms have subsided, nor when the spermatic cord is much engorged, nor when there is a suspected abscess either

* Lehrmann's Potencies.

in the testicle or the subscrotal cellular tissue. If, when applied, they afford a sensation of support and relief, and do not produce pain, it is evidence that they are beneficial, and should be continued; if, on the contrary, the pain in the part is increased, they should be immediately removed. In strapping a testicle (see Fig. 144) the surgeon should have the scrotum shaved and then drawn tightly upward on the affected side; then pass a strip of plaster, about an inch broad, above the enlarged testicle and round the corresponding side of the scrotum, so as to isolate it, as it were; another strip of half an inch wide is to be passed from behind, in a longitudinal direction, over the lower end of the testis, and upward upon the anterior part of the scrotum; and thus, by a succession of horizontal and vertical strips, neatly overlapping and drawn moderately tight, the organ is completely enveloped and compressed. In the course of twenty or thirty hours the swelling will be found to have diminished, the strips becoming loosened by the decrease of the swelling, when they should be removed and fresh strips applied. This should be continued from day to day until the organ assumes its normal size, during which time the parts should be supported by a suspensory bandage, and indeed even for weeks afterward.

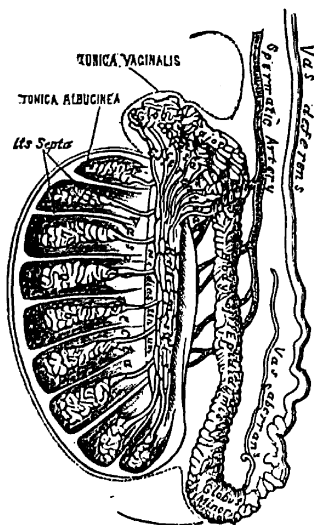
Fig. 144.



The application of *collodion* to the scrotum as a means of compression, first suggested by M. Bonnafont, was made a subject of discussion before the Academy of Medicine in Paris, and finally reported against. The plan of treatment proposed by Velpeau, which consists in puncturing the tunica-vaginalis and evacuating the contained fluid, no matter how small its quantity, deserves some consideration. This procedure is valuable, especially in those cases where the quantity of fluid has attained a considerable amount, and when the appropriate remedies have failed to disperse the contents of the sac, which in our hands, however, has been of rare occurrence. The peculiarity of Velpeau's practice depends upon the frequency with which it is employed, even though a few drops only escape after the puncture. It is claimed for this treatment that it gives immediate relief to the pain and shortens the duration of the disease. Cullerier also strongly favors this practice. As a general rule, it is a safe procedure, but rarely required.

Abscess, as the result of inflammation of the testicles, is of rare occurrence. Whenever it does occur, it will be known by a swelling at one point of the scrotum where fluctuation is felt, the skin being

Fig. 145.



thin, with evident signs of suppuration. A puncture should be made at the most dependent point, and the pus be permitted to flow out. Sometimes abscesses may form in another way: Inflammation begins in the tunica-albuginea, Fig. 145, adhesion taking place between the testis and scrotum, the abscess forming under the fibrous coat; and this giving way, the pus gets vent through the integuments. Into the aperture that necessarily results, a portion of the secreting tissue of the gland sometimes projects, and, becoming inflamed, forms a red, granular, and fungous mass, protruding through and overlapping the

edges of the aperture. The local treatment of this condition will be the same as that of ulceration, heretofore considered. If it occurs in a scrofulous constitution, the remedies recommended under that head may be employed.

Inflammation of the testis *in the inguinal canal* may sometimes take place even in adults, where the organ has not descended through the external ring, giving rise to a train of symptoms of a somewhat puzzling character, and closely resembling those of strangulated hernia. A sad mistake of this kind occurred in the practice of a distinguished Western surgeon, who mistook the enlargement thus made by the incarcerated testicle for a hernia, ordered a truss to be worn, and employed other means for the cure of the supposed hernia. The child becoming gradually worse under this treatment, the father sought the counsel of an eminent surgeon of New York City, who ordered the removal of the apparatus, when the real state of the case presented itself as an impacted testicle in the inguinal canal. The result of a mistake so serious to the patient may be better imagined than described. The diagnosis of such a condition may

be made out by the following: In cases of incarcerated testicle, a large, irregular tumor will be felt in one of the groins, in the region of the inguinal canal—in some parts hard, in others soft, and very tender to the touch, occasioning, when pressed, a sickening sensation. On examining the scrotum of the corresponding side, the testicle will be found wanting; and on passing the finger into the external ring, the organ can be felt securely lodged in the canal. The treatment will be conducted upon the same principles as advised under the head of Epididymitis.

Cases have been cured, under homœopathic treatment, that have existed for several months, and it is not improbable that a cure may be effected after a much longer period. I have succeeded, by the foregoing treatment, in curing a patient who had been thus afflicted for more than a year. When *both* testicles are interested in the diseased process, the case more urgently than ever demands the best-directed efforts of the practitioner, especially if the patient is young, vigorous, and contemplates marriage.

Diet.—The diet in this disease, during the inflammatory period, should consist of light, unirritating food, the same as recommended in inflammatory affections generally. When it becomes chronic in its character, more nutritious food may be permitted, avoiding all spices, stimulants, as well as the use of tobacco, coffee, etc.

§ 3.—Balanitis.

Definition.—Balanitis, strictly speaking, consists of an inflammation of the membrane covering the glans penis, though it is commonly made to include inflammation of the internal surface of the prepuce, *posthitis*; as well as inflammation involving both the glans and the prepuce, *balano-posthitis*.

Synonyms.—It is also known by the terms, *gonorrhœa spuria*, *balano-preputial gonorrhœa*, and *external blennorrhagia*.

Etiology.—Balanitis may arise from exposure to gonorrhœa, which is the more frequent cause, from leucorrhœal or menstrual discharges, from masturbation, want of cleanliness, violence, errors in diet, from too frequent coition, or from excessive exercise. It is also occasionally produced by syphilitic causes, or by the presence of chancroid.

Men having an unusually long prepuce, and those with congenital

phymosis, are particularly liable to this disease, from accumulation of the secretions from the sebaceous follicles behind the corona glandis. This sebaceous humor, if allowed to remain, will cause great irritation of the part, intolerable itching and heat; the discharge sometimes emitting a fetid odor. In many cases it will even produce ulcerations. These ulcerations are apt to make the patient apprehensive even of having contracted syphilis. When these ulcerations are present, the inguinal glands sympathize, become tender, irritable, and even tumefied. These secondary symptoms are too suggestive not to increase the apprehension of the patient, who immediately seeks for medical advice. Let practitioners be cautious, in these cases, in giving expression to suspicion of syphilis, for much mischief and distress is thus brought upon those whose mutual relations are of entire confidence and respect. If there is any doubt in the mind of the physician whether it is a severe case of balanitis, or mild case of chancroid, although such a doubt should not exist, let the patient have the benefit of such doubt in the diagnosis.

Symptoms.—The patient first complains of a tenderness and uneasy sensation at the end of the penis, accompanied by an itching and tingling beneath the prepuce. As inflammation of the membrane progresses, the parts become exceedingly sensitive to pressure, red, swollen, and denuded of epithelium. The excoriated surfaces occur in patches, and are the seat of a burning, scalding pain, when exposed to contact with the urine. A muco-purulent fluid is now secreted, varying in quantity and consistency, and resembling the discharge peculiar to gonorrhœa, for which it has occasionally been mistaken. In cases complicated with phymosis, the greatest care is to be exercised to prevent a collection of matter at the base of the glans. Phymosis, however, may be induced by an effusion into the cellular tissue of the prepuce, which always becomes more or less œdematous during the progress of the disease. The febrile reaction, on the general system is so slight as seldom if ever to attract attention.

Diagnosis.—The diagnosis is readily made by thoroughly cleansing the parts, and then pressing the finger along the under surface of the penis, observing whether the discharge proceeds from the urethra, or from the balano-preputial fold. The situation of the pain produced by passing the urine, is also an important diagnostic sign; in gonorrhœa, the pain extends along the whole course of the

urethra, whereas in balanitis it is confined to the orifice of the canal, and is much less severe.

The *prophylactic* treatment is entire cleanliness;* persons with a long prepuce should bathe the parts every day with castile-soap and water, and invariably so after coitus.

Treatment.—The first thing to be observed in the treatment is cleanliness. The parts should be gently though thoroughly cleansed, as often as three or four times a day, with tepid water, after which the mucous surfaces of the glans and prepuce should be prevented from coming in contact, by surrounding the glans with lint saturated with *calendula*. In severe cases, where the surfaces become extensively excoriated, a solution of *nitrate of silver*—ten grains of the salt to the ounce of water—may be applied with advantage. Provided there be great tendency to erections, owing to the inflammation, the penis should be enveloped in a thin fold of linen wet with cold water or some evaporating lotion, as alcohol and water. The patient should be kept quiet as possible, and forbidden all stimulating articles of diet. In the meantime administer a few doses of *mercurius sol.* Where it does not readily yield to this treatment, Dr. T. S. Verdi, of Washington City, advises “sprinkling the part with powder of cinnabaris, $\frac{1}{10}$, over the irritated surfaces; the itching will be almost instantly relieved, and the inflammation reduced in twenty-four hours.” When balanitis is complicated with ulcerations, a solution of *tannic acid*, applied by means of lint soaked in it, will heal these ulcers in from two to five days. The tannic acid coagulates the fluid excreted by the ulcers, which forms instantaneously a white scab. Granulation commences at once at the bottom of the sore, and in a few days the scabs drop off, leaving behind only a tender cuticle; oftentimes, however, these ulcerations burrow so deep that a depression is even left after the ulcers are entirely healed. The lint soaked with the solution should be changed three times in the twenty-four hours. These ulcerations can easily be distinguished from venereal chancres by not having raised or indurated edges.

In case, however, balanitis is complicated with phymosis, it will be necessary to employ a syringe to cleanse the parts, by gently inserting its nozzle between the glans and prepuce and injecting a

* I consider the absence of cleanliness, in persons with a long prepuce, a prolific cause of leucorrhœa in the female.

stream of tepid water within the fold. If excessive infiltration into the cellular tissue of the prepuce should occur, the tension, if excessive, may be relieved by small incisions.

To prevent the occurrence of subsequent attacks of balanitis, which are particularly apt to follow the first upon the least exposure, the parts should be carefully washed of all accumulations of their natural secretion as often as twice a day, and afterward moistened by an application of some astringent, as a weak solution of *alum*, or *tannin*, at the same time carefully avoiding all exciting causes.

Dr. Hornby says, in this disease, "*Thuja occid.*, 30th dilution, and *acid nitric*, 3°, effected successful cures, which, followed by *sulphur*, 30°, remained permanent. The disease being altogether of a local character, I have rarely found it necessary, in an uncomplicated case, to resort to other means than cleanliness, rest, and medicated lotions. In exceptional cases, complicated with dyscrasia of the system or other constitutional poisons, I can readily conceive the necessity of using the internal remedies indicated in those conditions."

§ 4.—Cystitis.

Inflammation of the bladder is another affection occurring as a result of the extension of the inflammatory action consequent on an attack of gonorrhœa. It may, however, arise from other causes; as from the use of instruments, from the irritation produced by fragments of calculi, or from external violence, as from a blow or a kick. It never occurs immediately after the commencement of an attack of gonorrhœa, but varies in time from three to six weeks afterward, and is generally confined to the neck of the bladder. Idiopathic cystitis is of rare occurrence.

Symptoms.—The symptoms first attracting attention are a desire to urinate frequently, a local pain and weight in the hypogastric and iliac regions, together with an itching sensation at the extremity of the pēnis. As the inflammation progresses, there is more or less irritation of the rectum indicated by tenesmus. The urine also becomes variously affected: is high-colored, mixed with more or less mucus, or with pus, and is frequently tinged with blood. These deposits readily precipitate by allowing the urine to stand in a vessel, and will be found to consist of a tenacious, jelly-like sediment. In other cases the symptoms are much more severe;

there is decided pain in the hypogastric region and perinæum, radiating to the extremity of the penis, the testicles, and groins; the desire to micturate recurs every few minutes, when only a very small quantity of dark-colored urine is evacuated, with difficulty and pain, sometimes followed by a few drops of pure blood, and usually by most distressing tenesmus at the vesical neck, which the patient endeavors to relieve by pressing upon the perinæum with one hand, while with the other he pinches the extremity of the penis. There is more or less febrile disturbance, full and frequent pulse, anxiety of countenance, loss of appetite, hot skin, and great thirst. Retention of urine, so common in prostatitis, is rare in gonorrhœal cystitis; and when it occurs, it is rather as a consequence of loss of contractility in the vesical walls, and the distended bladder can then be felt above the pubes. Lallemand, in reference to the diagnosis of inflammation at the neck of the bladder, attending catheterization, says: "In proportion as the instrument advances through the curved portions of the urethra, the pain of its introduction increases, and, when it reaches the vesical neck, becomes intolerable. The neck of the bladder closes as the catheter approaches it, and is pushed on before it, so that the instrument may appear to have entered the bladder, but, if left to itself, is partially forced out by the restoration of the neck to its natural position. Under these circumstances nothing would be gained by using force, which, moreover, is capable of doing harm. The catheter should be left in place until the spasmodic contraction has passed off, when the vesical neck opens of itself and appears to draw the point of the instrument into the bladder, by a kind of suction process, accompanied with a slight to-and-fro movement. The pain at this time is especially severe; it appears to the patient as if the catheter was touching a raw surface, and considerable difficulty is experienced in withdrawing the instrument, owing to the contraction of the vesical neck around it."

Acute cystitis most frequently terminates in resolution, though sometimes, in the chronic form, an abscess is produced, situated in the structure of the vesical walls, or in the cul de sac between the rectum and bladder. Hypertrophy, ulceration, rupture, and even gangrene, have been known to result from chronic disease of the bladder.

Termination.—Acute cystitis ordinarily terminates favorably. In

the chronic form of the disease, however, abscesses not unfrequently form in the substance of the vesical walls, or between the bladder and rectum. In rare cases, too, hypertrophy, ulceration, and even gangrene, occur. If rupture takes place in consequence of great distension, thus permitting an extravasation of urine into the cellular tissue or the cavity of the peritoneum, a fatal termination may be expected.

Treatment.—The treatment of cystitis, as one of the complications of gonorrhœa, is to be met by the use of those remedies most appropriate to the original disease. If fever occurs, *aconite* and *cantharis* may be given either singly or in alternation. These two remedies will seldom fail in controlling this affection, or at least in subduing the more violent symptoms.

If these fail, however, recourse may be had to *belladonna* with decided benefit. Camphor is highly spoken of, in six-drop doses of the tincture, for the violent and spasmodic urging to urinate. *Nuxvomica*, *pulsatilla*, and *sulphur*, are recommended by Yeldham as useful remedies in obstinate cases. When the affection assumes a more violent form, the gonorrhœa partially subsiding in consequence of the extension of the inflammation to the bladder, those remedies will be found curative which are recommended under the head of Idiopathic Cystitis—the most appropriate of which are *asparagus*, *cannabis*, *copaiba*, *terebinthina*, *tussilago far.*, *squilla mar.* Dr. Hale, in his “New Remedies,” has brought to the notice of the profession other remedies which promise to be of exceeding great value in the treatment of this troublesome affection. These are, *caulophyllum*, *collinsonia can.*, *erigeron*, *eupatorium*, *gelseminum*, *hydrastis can.*, *senecio*; the special indications for which will be found in the work already alluded to.

In inflammation of the fundus of the bladder, with constant urging to urinate, induced by the slightest accumulation of urine, with pain at every contraction, *squilla mar.* will be found extremely beneficial.

Digitalis is of value in ischuria, with contractive pain in the bladder, the disease being more spasmodic than inflammatory. *Hyoscyamus* is another remedy that has effected much good in my hands, where a good deal of irritation of the bladder existed.

Apis mellifica has proved of great value in those cases accompanied with burning and almost constant ineffectual urging to urin-

ate, with high-colored urine, sometimes tinged with blood. It possesses a specific action upon the mucous membrane of the bladder and urinary organs, and hence will be found beneficial in the treatment of this affection.

Mezereum, in painful micturition and drawing in the testes and cords, is a remedy of value.

The local treatment consists in placing the patient in warm hip-baths, and applying to the abdomen medicated lotions of the remedy administered internally.

In rare cases in which retention of urine takes place, catheterization is required, but should not be performed too frequently, for fear of increasing the inflammation. Diluent drinks, such as slippery-elm-bark infusions, flaxseed or gum-arabic water, will be found beneficial in soothing the inflamed organ and rendering less viscid the acrid and irritating properties of the urine. Dr. Thompson says that "the decoction of senega exercises a greater influence over the secretion of the bladder in cystitis than any other remedy." As a local application in decidedly chronic cases of cystitis, Bumstead recommends "injecting the bladder, by means of a double catheter, first with tepid, then with cold water, and finally with some astringent solution." He employs either nitrate of silver, one to five grains to the ounce of water, or Squibb's solution of the persulphate of iron, one-half dram to two pints of water, and repeat the application, according to the effect produced, from once a day to once or twice a week. A much more efficacious treatment is the following. Dr. T. L. Brown, of Binghamton, N. Y., strongly recommends "*hydrast. can.*, four drops of the tincture every six hours, employing the same remedies by injections prepared as follows: Half an ounce of the powdered root; soft water, eight fluid ounces; make a cold infusion by shaking the two together in a bottle; after the powder subsides, inject one ounce of the clear liquid into the bladder morning and evening, always after urinating, retaining the injection as long as possible. Improvement begins in forty-eight hours, resulting in a perfect cure. For ten years I have used the *hydrast. can.* with uniform success in inflammation of the bladder. Many cases of a recent origin were cured by taking the remedy without the use of it as an injection."

§ 5.—Stricture of the Urethra.

This is one of the most frequent and important of the various complications of gonorrhœa, and may be defined as an obstruction produced by a narrowing of the canal at one or more points. Stricture may proceed from three distinct conditions: 1st, from spasmodic action of the muscular tissues surrounding the urethra; 2d, from congestion or inflammation; or, 3d, from changes in the tissue of the urethra, occasioned by a deposit of plastic lymph. Hence, there are three varieties: the *spasmodic*, the *inflammatory*, and the *permanent*.

1. **Spasmodic Stricture.**—This form of stricture was formerly a subject of dispute, it being doubted by many that the urethra is possessed of muscular fibers. The researches of Kolliker and Hancock, however, have resulted in a complete demonstration of the muscularity of the urethra; and, reasoning from analogy, we can not escape the conclusion that spasm may occur in any part of the canal, presenting the usual phenomena of spasmodic action in other parts of the body. Those of great nervous irritability are particularly liable to it. High living, stimulating drinks, exposure to wet or cold, or free sexual indulgence, also predispose to an attack. It is sometimes occasioned, too, by practicing catheterization, as well as by irritation of the rectum dependent upon ascarides, hæmorrhoids, and fecal accumulations. It is especially characterized by its sudden appearance and quite as sudden disappearance, especially in persons of delicate habit, and is evidently associated with more or less congestion. The same condition is also found in certain fevers, and often in accidents requiring that the patient remain supine, as in fractures of the leg, etc. At the time of the occurrence of the spasm, there is often a sensation of weight and uneasiness in the perinæum, with evident irritation of the urethral mucous membrane, as shown by reddening of the lips of the orifice. The urine is passed with the greatest difficulty, escaping in drops, or it may suffer complete retention.

2. **Inflammatory Stricture** results from congestion or from actual inflammation of the urethra. In the latter instance, the caliber of the canal is obstructed by a deposit of serum or lymph, which latter product may become organized and lay the foundation of perma-

ment stricture. In this variety, swelling is a constant and very characteristic symptom, which is due to a congested condition of the capillaries, accompanied by more or less effusion into the cellular tissue. There is a sense of weight and fullness in the perinæum; pain along the course of the urethra, with scalding during micturition; the penis is tumescent, the lips of the meatus reddened and somewhat everted. Paralysis of the muscles of the vesicle triangle frequently occurs as a complication, especially after long-continued efforts in retaining the urine, as is often seen in gonorrhœa. This form of stricture is frequently associated with spasm, and is particularly liable to attack those of full habit, who eat and drink freely, or commit excesses in sexual indulgence. Rheumatic and gouty subjects, suffering from irritability of the skin and mucous membranes, are also frequently the subjects of attack.

3. **Permanent Stricture**, though sometimes the result of repeated attacks of spasmodic stricture, is generally due to the organization of plastic lymph which is thrown out in consequence of the inflammatory action. The seat of this deposit is commonly in the substance of the lining membrane, or subjacent cellular tissue; and in proportion as the consolidation of the tissues takes place, a necessary contraction of the canal follows. The inflammation producing this condition of things may be due to a variety of causes, as blows, kicks, cicatrization of chancres or chancroids, gonorrhœal poison, ulceration, etc.* The severity of the inflammation, however, is not so much to be dreaded as its long continuance; and hence the danger of permitting gleet to run on indefinitely, as it will almost invariably eventuate in stricture.

Symptoms.—Among the first symptoms which attract the patient's attention is some disturbance respecting micturition, such as a slight irregularity in the stream, a desire to pass water more frequently than usual, with the retention of a few drops of urine, which, after evacuating the bladder, dribble away and soil his linen. At the same time he will notice a slight muco-purulent discharge from the urethra, with a feeling of weakness about the genital organs. As the affection progresses, the symptoms become much aggravated and

* It appears, from a table arranged by Thompson, that gonorrhœa is first, and injuries of the perinæum second, as regards frequency in the etiology of stricture.

increased in number. His sleep becomes disturbed by repeated calls to urinate, the stream now becomes spiral, forked, or fine as a thin wire; or it may, from distention of the bladder, pass involuntarily, and has been mistaken for incontinence of urine. Blood may also be passed, coming from the bladder or from the urethra. When proceeding from the former, it is uniformly diffused through the urine, the latter part of the stream being darker than the first. If it come from the urethra, it escapes in clots, or may be discharged independently of the flow of urine. Complete retention may also occur at any stage of the disease, in consequence of congestion and spasm, and which may occasion so great a distension of the bladder as to result in rupture; more commonly, however, the rupture occurs in the urethra immediately behind the seat of stricture. Owing to extreme dilatation, other serious complications may arise, such as abscess of the prostate; or the irritation, being conducted along the vas deferens, may result in epididymitis, or produce ulcerated openings behind the scrotum, or near the anus. Abscesses in the perinæum, however, are generally to be regarded as evidence of rupture.

Diagnosis.—There are other affections of the urinary organs liable to be mistaken for stricture, such as sub-acute inflammation of the prostate, neuralgia of the urethra, stone in the bladder, or hyperæsthesia of the organs; indeed, the patient may have pain, a frequent desire to urinate, and a dribbling of urine, and still the urethra be in a perfectly normal condition. Nearly every symptom mentioned as belonging to stricture may be present in sub-acute inflammation of the prostate. Stone in the bladder produces the peculiar corkscrew stream, with frequent micturition, pain and dribbling of urine, together with other symptoms of stricture. Hyperæsthesia, depending on the irritation of stone or affections of the rectum, may give rise to a similar train of symptoms, while, other cases, again, seem due entirely to nervous derangement. Hence, the greatest caution is to be exercised in arriving at a diagnosis. Ordinarily, however, the introduction of a catheter or sound will prove the surest means of determining the nature of the difficulty.

Pathology of Stricture.—In mild cases of stricture, the canal in front of the contraction preserves its normal dimensions and character; but in severe and chronic cases, when the flow of urine has been much obstructed, and the anterior portion of the urethra, either

through sympathy or continuity of tissue, has participated in the inflammation which chiefly affects the part behind the stricture, it is contracted. Another condition, difficult of explanation, is one of *dilatation*, which, in a case described by Sir Charles Bell, was very considerable. Instances in which the urethra was ulcerated in front of the stricture are also mentioned by the same author. Posterior to the stricture the urethra is generally enlarged, as a natural consequence of the impediment to the free evacuation of the bladder. The canal ultimately loses its elasticity and becomes *dilated* so as readily to admit the finger, or even form a pouch, which resembles a fluctuating tumor, in the perinæum. Sir B. Brodie relates the case of a patient with stricture about three inches from the extremity of the penis. Whenever he passed water, a tumor of the size of a large orange appeared in the perinæum; on opening which, the urine flowed through, and the stricture was cured by mechanical dilatation. The *prostatic* portion of the urethra is particularly susceptible of dilatation, while the *membranous* is less so; when the stricture lies in front of the triangular ligament, the membranous portion *may* retain its natural dimensions—an important matter to be remembered in case of perineal stricture, where dilatation, as a guide to incision, may be sought for when it does not exist. When there are two or more strictures, the urethra is usually more or less dilated between them.

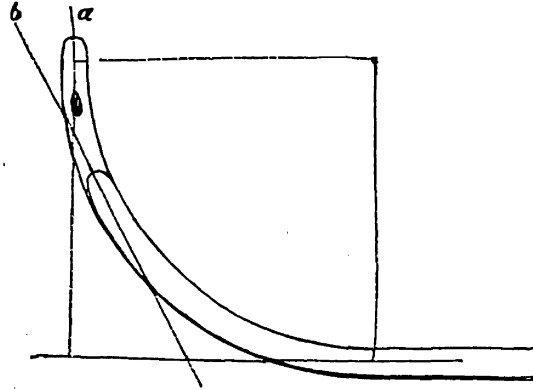
The mucous membrane, especially behind the stricture, is the seat of chronic inflammation; is sometimes puckered and contracted; sometimes thin and minutely injected with blood-vessels; the surface is generally covered with a layer of pasty exudation; and it is from this source and from the bladder that the gleety discharge, which is so constant an attendant upon stricture, is derived. Ulceration may take place—sometimes superficial, at other times deep-seated—producing large and ragged excavations of the urethral walls, and in rare cases it causes destruction of the constricted portion of the canal. Sir B. Brodie mentions the case of a person who had suffered from very severe pain at the site of the stricture for several days, after which his condition was much improved, and he passed water better than he had done for years. The whole train of circumstances indicated that the constriction had been removed by the process of ulceration.

Treatment.—The treatment of stricture varies according to its characteristics. If it be of the spasmodic variety, and produced by any of the causes heretofore enumerated, it may be overcome by placing the patient in a warm-water bath, or by using the warm hip-bath, having previously administered an *enema* of one dram of the tincture of opium to a pint of warm starch-water, thrown up the rectum. The urine will usually be passed while the patient is in the bath. I have occasionally overcome this species of stricture by anointing the integumental covering of the urethra with extract of belladonna, and rubbing the parts thus covered briskly with the finger. More recently I have employed, with great success, Dr. Richardson's nebulizer, in which equal parts of ether and the tincture of opium have been dissolved, the spray being thrown upon the skin immediately covering the seat of stricture until full and complete relaxation shall have taken place (see page 146). In lieu of the tincture of opium, dissolved acetate of morphine may be used in conjunction with the ether. If the spasm continues, as it often does, for several days after this, a *full-sized* wax bougie or catheter should be introduced every second or third day, in order to lessen the irritability of the urethra.

Instruments for Dilatation.—The instruments used in diagnosing and overcoming stricture are a set of catheters and sounds, ranging from No. 1 to No. 15 of the catheter scale in ordinary use; a good supply of gum-elastic bougies, and several sounds with bulbous points. Either the catheter or sound may be used, as seems most fit to the surgeon. The degree of curvature which these instruments should possess has been a matter of considerable dispute among practitioners. Mr. Thompson has adopted the principle that the curve should correspond to the natural curvature of the least movable portion of the urethra, or that portion lying under the symphysis pubis. His principle has been generally adopted by the profession, and experience confirms the deductions from his theory in this: that urethral instruments made with this curve are most readily introduced. The accompanying cut, Fig. 146, exhibits a catheter and sound so bent as to correspond to this curve, which is described as an arc of a circle three and a quarter inches in diameter, the cord of the arc measuring two inches and three-quarters. Catheters of a shorter curve are used and recommended by some surgeons

as more easy of introduction than the large curve; but after all, I am satisfied that this preference depends more upon being accustomed to the use of the instrument than its mechanical adaptability.

Fig. 146.



"It is desirable," says Bumstead, "to have one or more catheters graduated in inches and fractions of an inch, in order to measure the depth at which strictures are situated,

and to determine the length of the urethra; when used for the latter purpose, the graduation should commence with the terminal opening, and not from the extreme point."

An ingenious substitute, and which may be made serviceable in cases of emergency, has been proposed by Dr. Stearns, of New York, and consists of a piece of ordinary bell-wire, doubled upon itself and bent to a proper curve. As soon as it enters the bladder, the urine escapes between the sides of the two wires. Sounds of solid silver are the best, but too expensive for ordinary use. Pure and highly-polished steel, to avoid the action of rust, fulfill every indication, and are within the reach of all.

Gum-elastic bougies are generally preferable to all other varieties of this kind, except for very narrow strictures, when those composed of catgut or whalebone are to be preferred, as being of firmer structure and less liable to bend or break.

Bulbous sounds, made of steel, are serviceable in determining the extent of a stricture from before backward, and also in ascertaining if a second stricture exists posterior to the one already discovered. At the suggestion of Dr. G. A. Peters, of New York, Messrs. Tieman & Co. have recently manufactured a bulbous sound with a fine stem, upon which bulbs of different sizes may be screwed. The small size of the shaft gives to bulbous sounds, when passed through one contraction, considerable freedom of motion, and

enables the operator to explore for strictures more deeply situated. For introduction of the catheter and sound, the student is referred to page 173, *et sequitur*.

If the introduction of the instrument causes irritation and increase of spasm, it is advised to discontinue its use temporarily, and depend upon constitutional treatment. But the surgeon should not be discouraged, even if the first few introductions of the instrument appear to increase the irritation; as when the urethra becomes accustomed to the use of the bougie, relaxation of the spasm will take place. At the same time the patient's general health should be attended to and those remedies employed which counteract the constitutional derangements. If obstruction to the flow of urine depends on simple tumefaction of the membrane, the stricture being produced by the irritating properties of urine, *aconite* and *cantharis* may be given internally, the patient drinking freely of diluent fluids—low diet being imposed, and fomentations of *aconite* applied to the perineal region. If the patient be subject to frequent attacks of this kind, much benefit will be derived from lightly touching the canal at the seat of stricture with a weak solution of *nitrate of silver* or the *acid nitrate of mercury*. When pain and tenderness are felt along the course of the canal, with frequent desire to void the urine, accompanied by a trace of purulent discharge, Yeldham recommends "one drop of the third dilution of *aconite* at bedtime, and a like dose of *cantharis* twice a day, restricting the patient, at the same time, to unstimulating food and drink." He also recommends "the application of a cold-water compress," in less urgent cases, to the perineal region. After the foregoing medicines have fulfilled the indications for which they were given, he recommends "a course of *mercurius* and *sulphur*, giving a drop of the sixth tincture of the former twice a day for a week, and following it with the sulphur in the same manner."

As preventive treatment of these attacks, a careful regulation of the diet should be enjoined, with warm clothing, keeping up the action of the skin by the daily use of horse-hair gloves and tepid salt-water baths.

The treatment of inflammatory stricture, though more influenced by constitutional than local causes, also requires the occasional introduction of the bougie in order to prevent the stricture becom-

ing permanent. It is to be combated like the spasmodic variety, and by the same remedies recommended under that head. When it is so complete as to cause retention of urine, it will be necessary to employ the same agents just detailed in the spasmodic variety.

The following remedies, adapted to both varieties of this disorder, will be found sufficient to overcome suppression or retention of urine dependent upon the causes enumerated, viz: *cantharis*, *cannabis*, *arnica*, *rhys radicans*, *belladonna*, *solidago virg.*, *agnus castus*, *tussilago*, *terebinthina*, and *uva ursi*.

Cantharis and *cannabis* are indicated in suppression from chronic inflammation of the kidneys, and in retention from long-continued irritation of the neck of the bladder.* They may also be employed in suppression and retention from acute inflammation of the kidneys and bladder, after the febrile symptoms have been subdued by *aconite*. Hahneman advises the use of these remedies in retention from paralysis of the neck of the bladder, and in cases of chronic retention arising from thickening and induration of the mucous membrane.

Arnica is our best remedy when the functions of the kidney and bladder have been impaired or suspended by mechanical injuries, falls, contusions, sprains, blows, and concussions, or by the irritation of calculi.

Rhus radicans, *belladonna*, and *solidago virg.*, are applicable when the disorder has proceeded from metastasis of gout or rheumatism. Either of these medicines may be alternated with *aconite* when the inflammatory symptoms run high.

Agnus castus is an excellent specific in retention in consequence of paralysis of the bladder. *Nux vomica*, *tussilago*, *arsenicum*, and *oleum terebinthina*, are remedies which should command attention in paralytic retention.

Spasmodic retentions are readily cured by *camphor*, *belladonna*, and *aconite*.

When gravel or calculi are the exciting causes of the affection, the employment of *uva ursi*, *solidago virg.*, and *belladonna*, is advised.

Affections of the prostate gland may be met by *pulsatilla*, *sulphur*, *aconite*, *rhys rad.*, *arsenicum*, and *iodine*. Retention

* Marcy and Hunt's Homœopathic Practice of Medicine.

from onanism, from excesses in venery, is treated best with *acid phosphoric*, *agnus castus*, *cantharis*, *cannabis*, *rhus radicans*, and *arnica*.

Clematis erecta has been found in my hands of great service in the inflammatory variety of stricture, terminating by serous infiltration into the sub-urethral tissue and the formation of a sub-mucous callus.

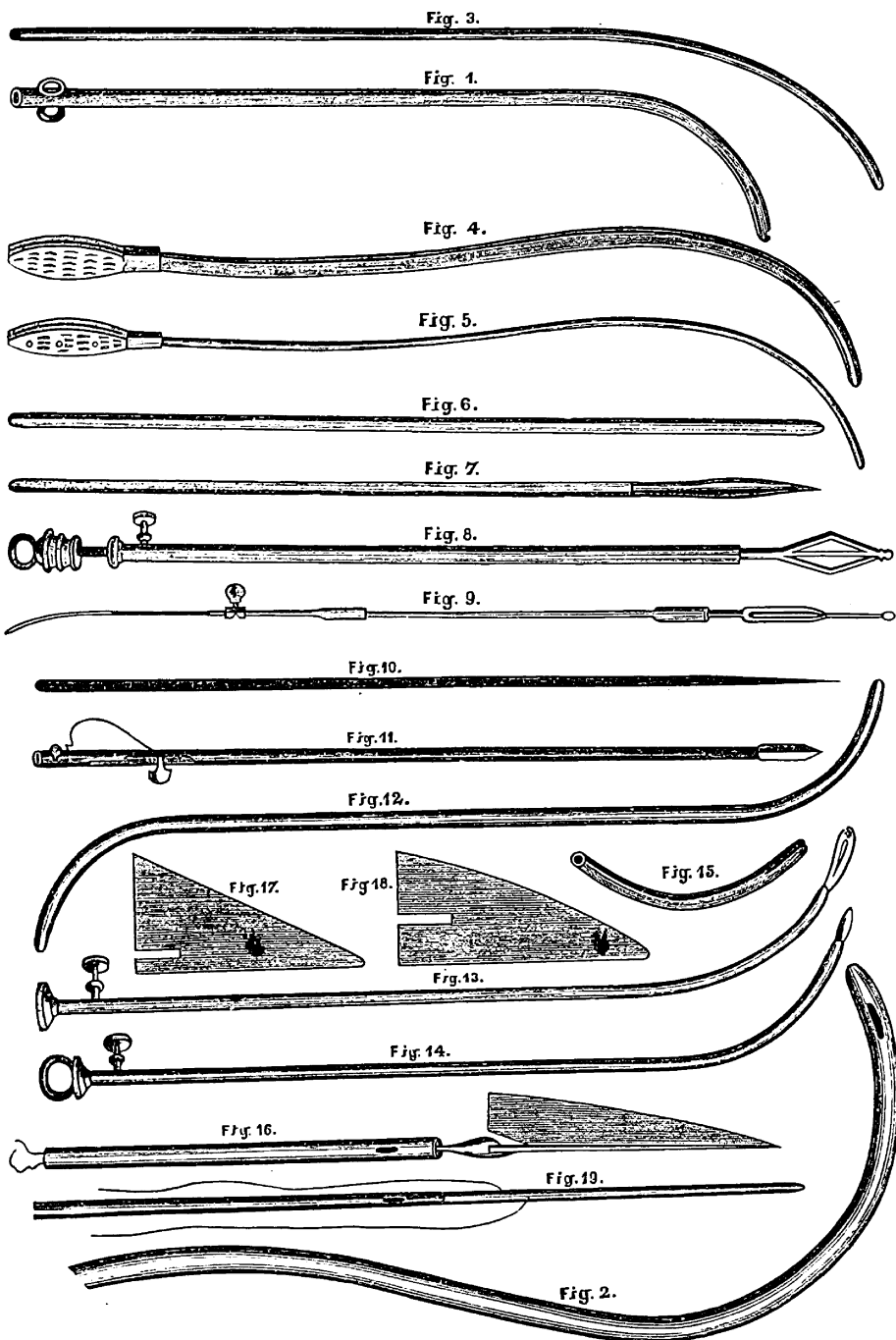
Electro-magnetism is another means employed to overcome this difficulty. It is a powerful remedy, and should only be employed when other means have failed, or when the inflammation has been reduced by appropriate medicines, and then extreme care and moderation in its use should be enjoined. Of all the instruments used for this purpose, none in my hands have produced the same amount of benefit as Palmer's electro-voltaic battery. In fact, with this instrument I have overcome a spasmodic stricture of the urethra when all other agents had failed. Inflammatory strictures require the occasional introduction of bougies to prevent the constriction becoming permanent. In using bougies, care should be exercised that they be introduced cautiously and slowly. A slight hemorrhage sometimes follows their use, which seems to be rather beneficial than otherwise, occurring more as the result of compression of the mucous membrane than laceration of the inflamed tissues.

The treatment of permanent stricture may be conducted by three methods: 1st, *mechanical dilatation*; 2d, *caustics*; and 3d, *incisions*. Whatever plan is adopted, the surgeon must remember that the operations are to be performed upon a canal endowed with exquisite sensibility, that sympathizes acutely with the general disorders of the system; and in those instances where improper violence has been committed, or too active measures employed, a degree of irritation is produced that rapidly extends to neighboring structures, sometimes jeopardizing the life of the patient. A knowledge of this should not, however, lead the surgeon to run into the opposite and equally dangerous extreme of neglecting to employ efficient and reliable means to overcome the obstruction. An aggravated stricture is one of the most serious of diseases, and will inevitably, if left alone, terminate fatally by the induction of renal disease; and no hesitation should be had in using all legitimate means for its removal; and if these are properly applied, success almost always attends the surgeon's endeavors. At the same time, however, that

local means are being employed, it is necessary, equally with the other varieties of stricture, to use constitutional treatment. Permanent stricture is often more or less associated with spasmodic or inflammatory stricture, and should be treated, when such is the case, by the remedies recommended under those heads. Various means have been employed by different surgeons to ascertain accurately the character, situation, and condition of a stricture. Among the most reliable of these is the following plan, which is a slight deviation from that suggested by Ducamp:

To take the cast of a Stricture.—Procure a piece of silk ribbon about three inches long and two inches wide, as represented in Plate II, Figs. 17, 18; then pull out all the transverse threads to within three-fourths of an inch of its length; next melt equal parts of beeswax, shoemakers' wax, and resin, in a cup; fasten the sound part of the ribbon to a wax bougie by a few stitches, or by a thread wound around it, securely fastening it to the instrument; then, dipping it into the melted wax, saturate the longitudinal threads of the ribbon with the mixture; dip this into cold water, and then mold it with the thumb and fingers into a conical shape, Plate II, Fig. 7. Carry the bougie thus armed to the point of stricture, and press gently against it, and in a few seconds a perfect cast of the part will be taken; always provided, a bougie has been selected of sufficient size to *fill up the canal*. Having thus acquired a knowledge of the character of the stricture, recourse may be had to one or the other of the processes recommended for its removal. As a general rule, *dilatation* is better applicable to strictures of a recent date, to those not very much contracted, or to patients who are willing to take the time to have the obstruction properly and permanently removed. *Incision* is preferable in old, dense, and almost impermeable strictures, where the patient can be carefully treated after the operation. *Caustic* proves most valuable in those cases where, from the position of the stricture, incision would be of doubtful efficacy, as in the membranous portion of the urethra. Each of the above plans has its respective admirers, and are variously employed, according to the penchant of the surgeon.


1. *Mechanical dilatation*, as it is termed, is the usual and most successful mode of treating ordinary strictures. But the stricture is not cured, as it would appear, by its mere stretching or forcible dilatation. It is cured by the absorption of the plastic matters effused



in and underneath the mucous membrane by the continued and uniform pressure of the instrument against the walls of the urethra. Dilatation is only applicable to those strictures that are sufficiently patulous to admit the point of the instrument, being at the same time of such flexibility as will permit the distension of the urethral parietes. The instruments used for this purpose are of *metallic* or *elastic* material. The metallic are silver catheters, steel sounds, plated or pewter bougies. The elastic comprise all those instruments made of a soft or yielding material, as gum-elastic catheters; catgut, wax, or elastic bougies. Though preference is given to one or the other of these varieties, it is recommended that both kinds enter into the list of the surgeon's armamentaria, for it will be found that in some cases the elastic will prove the most advantageous instrument; in others, the metallic. As a general rule, the *metallic* instruments are decidedly preferable when the stricture is tight, old, and cartilaginous; the *elastic* when they are patulous, soft, and compressible. The shape and curve of catheters and sounds vary according to the bias of the surgeon—some preferring the long, and others the short, curve. For my own part, I have succeeded best with Thompson's curve, as being the best adapted to the anatomy of the parts through which they are compelled to pass. In the use of sounds, those should have preference that are slightly conical, the thickest part corresponding with the bend of the instrument, and well rounded at the point. Sounds are preferable when the stricture will permit passage to a moderate-sized instrument. It should have a broad metallic handle, as represented in Plate II, Fig. 4, which transmits sensations communicated to its point more accurately than a wooden one. If a catheter is used, as is recommended in small strictures, where the difficulty of entrance is great, it can be left within the urethra and supersede the necessity of frequent introduction. To be serviceable, it should be made very solid and stiff, the wings large, and the fenestræ well rounded off and somewhat depressed, so as not to scrape the urethra in passing inward. In using these instruments great caution is required for fear of imposing unnecessary violence upon the tissues; at the same time it should be understood that it is impossible to get through a close, tight stricture without using more or less force. The instrument will not "find its own way" along a strictured urethra as in a healthy one; hence, considerable experience is required by the

operator, and the force used should not only be in proportion to the amount of resistance, but it should be directed with tact and skill. Instruments are generally most easily introduced by laying the patient upon his back, the head and shoulders somewhat depressed, and the pelvis elevated. The surgeon, standing on the left side, proceeds with the operation as advised in the chapter on Catheterization, page 173. In cases of extreme difficulty, the operation may be facilitated by injecting and slightly distending the urethra with oil before attempting to pass the instrument. In every case of suspected stricture, the golden rule is to make the first examination with an instrument large enough to distend the urethra, never mind what the previous history of the case may be. The difference in the impression conveyed to the hand of the operator, by mere spasmodic contraction of the urethra and an organic stricture, can be better felt than described. In the first case, in spasmodic contraction the natural suppleness of the tissues is preserved; while in the other a firm, resilient obstacle is felt, which seems to grasp or hold tightly the instrument passed over it. If the stricture be tight, crooked, and hard, it may be somewhat difficult to pass a metallic instrument through it. Sir B. Brodie has recommended a plan alike simple and advantageous. He takes a fine catgut bougie, and bends it in the shape shown in Fig. 147, about one inch from the

Fig. 147.



point, so as to follow the track of the stricture more closely. In this way, strictures that under the ordinary process are either not passable at all, or, if so, with the utmost difficulty, are by this plan overcome with comparative ease. Besides this, many strictures may be readily passed while the patient is under the influence of chloroform, that are not pervious in any other way. Success has repeatedly attended the operation by the use of this agent in those strictures that have been impenetrable for months and years without it. Gum-elastie bougies and catheters, when coming into contact with tight strictures, bend backward, and on that account are not near so manageable as metallic instruments. Unlike the latter class, they are more easily introduced when the patient is standing, having taken the precaution to curve them slightly before introduction. The wire stylet, usually accompanying the elastic bougie, is not ordinarily required, as the instrument passes through the canal more readily without it.

Before employing dilatation, the surgeon should first have the patient's general health prepared for the operation. The condition of the digestive organs and nervous system should be inquired into, and, if deranged, treated by appropriate remedies. Having attended to the constitutional treatment, the surgeon should select a solid metallic bougie (as shown in Plate II, Figs. 4 and 5) adapted to the size of the canal; after warming and oiling it, carry it gently down to the point of stricture, and, retaining it in this position for a few minutes, press cautiously forward until it passes the strictured surface. If, on the contrary, it be found impossible to pass the stricture, the instrument should be made to engage the induration for ten or twenty minutes, when it may be withdrawn, and another trial made in two or three days. The introduction of an instrument usually gives rise to a smarting, painful sensation in the urethra, most severe as its point approaches the neck of the bladder, and oftentimes attended with nausea and faintness. As a rule in less severe cases, the instrument should be passed every second or third day, being retained about five minutes, or until the spasm occasioned by its introduction has passed away. In those "case-hardened" patients, where the stricture is thick and very tight, a correspondingly small instrument will be selected, which, having passed the stricture, should be retained for twenty-four or thirty-six hours, when it will be found that, however tightly grasped it was at first, it has become loosened—a slight discharge taking place from the urethra. The instrument may now be withdrawn, and introduced again at the end of two or three days, or when the irritation of the urethra has subsided. The augmentation of the size of the bougie should be very gradual, increasing it one size at each introduction. This will not be borne in all urethras; when such is the case, the same-sized bougie may be used two or three times before substituting the next larger number, and so on until the canal has gained its normal caliber. After this it will be necessary, in order to effect a perfect cure, to introduce the last-sized instrument once a month for several months. *Too rapid dilatation* is prone to produce inflammation of the testes, and sometimes perineal or prostatic abscess. I have witnessed in two patients the ill effects consequent upon a sudden and too hasty dilatation of the urethra, and believe it to be dangerous practice even in the most skillful hands.

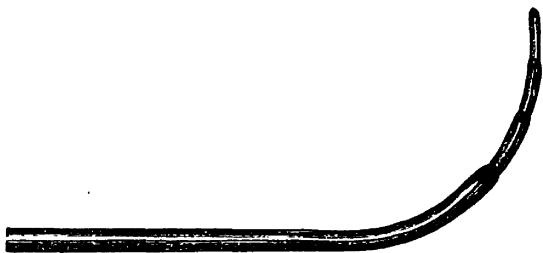
False passages may be made by the instrument passing out of

the urethra and into the surrounding tissues. They are apt to occur in tight bridle strictures, when a small instrument is being used, the point of the catheter being pushed against the side of the urethra, the instrument passing downward and to one side of the canal. This will be known to the surgeon by the *sudden* slipping forward of the instrument, and the *direction of the shaft* as compared with the line of the urethra. The patient will complain of severe pain, and is himself conscious that a laceration has taken place. In such a dilemma the surgeon should immediately withdraw the instrument and introduce another of larger size, being careful to slip it beyond the artificial opening by keeping the point in a direction opposite to that which caused the false passage. Pushing it gently forward into the bladder, it should be retained within for two or three days, then withdrawn, and reapplied as soon as inflammation in the parts has passed away.

When the stricture is situated quite near the urethral orifice, the best instruments for overcoming it are the nail-headed stylets of graduated sizes. These strictures are found to be troublesome to cure, having a disposition to return.

Mr. Thomas Wakely has brought before the notice of the profession an ingenious and valuable method of rapidly dilating strictures. It consists of an instrument, Fig. 148, in which a No. 1 silver

Fig. 148.



catheter is employed as a guide, which is first introduced into the bladder, and the tubes passed in succession over it until the requisite degree of dilatation has been effected. The instrument is then to be withdrawn and a flexible catheter introduced, of a size equal to the last silver tube passed beyond the stricture, which should be retained until the next visit.

Other instruments, fulfilling the same indications, have been invented, among the most important of which is that of M.

Maisonneuve, which he terms "*catheterism a la suite.*" It consists of a very slender and flexible bougie, well adapted to pass the longest and most tortuous strictures, which is introduced as a pioneer; at its external extremity, instruments of various sizes are attached, which, following the bougie as a guide, are passed through the obstruction until the required dilatation has been accomplished, the flexibility of the latter permitting it to be coiled up in the bladder as fast as it enters its cavity. If it is desired to draw off the urine, a hollow bougie with an opening in its side may be passed into the bladder, while larger bougies or a urethrotome may be attached for the purposes of dilatation or internal incision. I can see no advantage in this instrument over that of Mr. Wakely, except, perhaps, in those strictures complicated with retention, when it is impossible to introduce any instrument save that of the bougie in question.

By attention to the preceding directions, most strictures may be cured in a few weeks. Some, however, can not be cured in this way—the induration yielding until it has reached a certain stage, when it can not be advanced any further. In such cases, other measures will be demanded, viz: *caustics* and *incision*.

Caustics.—In treating strictures by caustics, the profession is divided in opinion; some strenuously advocate the procedure, while others as violently oppose it. Although recommended by eminent authorities, such as Whately,* Wade,† and Gross,‡ it has not generally met with much favor, and has been regarded as too *uncontrollable* and *unsafe* to be experimented with. The following is the manner in which this operation is conducted: Pass a well-oiled wax bougie down to the seat of stricture, and mark with the finger-nail or other agent the instrument opposite the meatus. Withdraw the bougie, and, having another one prepared of similar length and size, armed by a piece of potassa fusa or solid nitrate of silver, the size of a pin's head, placed within its end, pass it rapidly to the seat of stricture, engaging it firmly for two or three minutes, and then quickly withdraw it. The application of the caustic, which is followed by gleet discharge, is to be repeated

* An Improved Method of Treating Strictures in the Urethra; 1804.

† Stricture of the Urethra, Fourth London Edition; 1860.

‡ Op. cit. p. 788.

every second or third day until a proper-sized bougie can be passed, when the dilatation may be proceeded with in the usual way. Mr. Liston speaks of the process as most atrocious. His opinion will be corroborated by every surgeon who has had much experience in treating strictures; better and more satisfactory results being accomplished by a catheter or sound in an ordinarily skillful hand.

Incisions.—"It has been asserted," says Bumstead, "that when any instrument can be passed through a stricture, dilatation is all-sufficient, and that it is never necessary to resort to cutting instruments; but, although this statement is applicable to the majority of urethral contractions, it is not universally true, for strictures are frequently met with which are so unyielding that dilatation has little if any power over them; or so irritable that attempts at catheterism can only be made at long intervals; or so resilient that relapses constantly occur." In such cases, urethrotomy may be employed with decided advantage. The division of the stricture may be effected by one of two ways: division from *within* and division from *without* the urethra, through the perinæum. The division *from within* may be effected, first, by passing a concealed steel stylet down to the point of stricture, overcoming the obstruction by directing the lancet forward; and is only applicable to those strictures situated anteriorly to the scrotum, in that portion of the urethra where the canal is straight. In those strictures lying beyond the scrotum, in the deeper parts, where the canal is curved, the operation will be fraught with danger, as it is impossible for the surgeon to guide the stylet exactly in the direction of the canal, and perforation of the walls may ensue. The most convenient instrument for dividing stricture anterior to the scrotum is the one shown in Fig. 148, which has a probe end that passes into the canal and

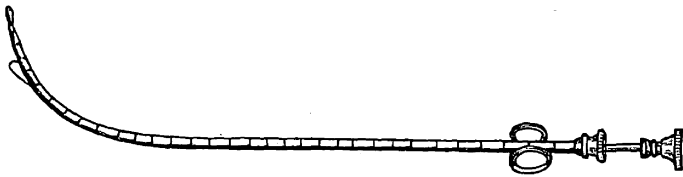
Fig. 148.



serves as a guide to the blade, which is projected through the stricture and withdrawn again by the action of a spring attached to the upper end of the instrument. Another instrument for effecting this

purpose is represented in Fig. 150, invented by Dr. George A. Peters, of New York City. It consists of a sound with a groove, in which a blade slides, and within which it is concealed, except when passing over a projection situated about an inch from its extremity. The diameter of the sound is about three of the ordinary catheter scale, and the instruments may therefore be used in strictures of very small caliber. Numerous urethrotomes have been invented for

Fig. 150.



the purpose of dividing strictures from *within* the urethra ; among the most important of which are Dr. Westmoreland's (Atlanta, Ga.), Charriere's, and Maisonneuve's. The first-named instrument consists of a canula, which is introduced to the point of stricture ; an exploring wire concealed within is passed through it, and a blade sliding upon the wire divides the constriction. Mr. Charriere's urethrotome is intended to cut from behind forward, as well as from before backward. When used in the former case, a fine, flexible bougie is attached to the instrument and made to pass through the stricture, followed by the urethrotome ; the instrument is now withdrawn, and the constriction is completely divided. Maisonneuve's urethrotome partakes of the same general character as that of Charriere ; but, not being much used by the profession, requires no extended description.

Another mode of dividing strictures from within the urethra is to pass a catheter, with a concealed stylet, through the stricture, and then, projecting the stylet, withdraw the instrument. The stricture that will permit an instrument to pass it is sufficiently amenable to treatment by the ordinary process of dilatation ; hence, incisions in those strictures are of doubtful expediency.

External incision, Perineal section, or Syme's method.—The division of stricture *from without*, by incision through the perinæum, may be performed by two distinct operations. The *first* is applicable to those strictures which are *pervious* to an instru-

ment; the *second*, to those which are *impervious*. In the *first* case, a grooved staff is passed through the stricture, and the section made upon it; the *second* is where the surgeon attempts its division without the staff or other instrument, having no other guide than the anatomical structure of the parts. The principles which should determine the surgeon upon performing the operation of *urethrotomy* are the following: *

1. It should not be regarded as applicable to any considerable proportion of the whole number of strictures, but be reserved for exceptional cases, in which milder means have failed.

2. It should not be employed in a low state of the vital powers, nor where extensive disease of the kidneys is present; since, under these circumstances, the danger of a fatal result is materially increased.

3. It is advisable, in impassable, unyielding, highly-irritable, or resilient strictures, which have proved incurable under a thorough and persevering trial of dilatation. The presence of false passages is an additional inducement for its performance, since the abnormal channel may be cured at the same time that the stricture is relieved.

4. It is justifiable in some cases of retention of urine dependent upon stricture, although in most cases puncture of the bladder is to be preferred.

Pervious Stricture.—The operation having been decided upon, the patient's system should be prepared for it by rest and attention to any constitutional derangements that may exist. The perinæum should be shaved, the rectum evacuated by an enema, the patient secured in the position for lithotomy, and put under the influence of an anæsthetic. The instruments required for the operation are, a staff, a No. 8 silver catheter, a pointed scalpel, and a broad director. The staff should vary in size from No. 1 to No. 6, according to

Fig. 151.



the tightness of the stricture; it should be grooved along its convexity for about one-third of its length, as represented in Fig. 151; and having previously been

lubricated, pass it well through the stricture, so that the shoulder rests against the upper part of the constriction; the surgeon now

* Bumstead on Venereal Diseases.

seats himself in front, places the scalpel, with the back of the blade downward, into the mesial line of the perinæum, a little above the rectum, and cuts upward for an inch or more *in the raphe*. The dissection is carried on very carefully, exactly in the median line, until the staff is reached, when the knife must be entered into its groove *behind* the stricture and carried forward through it; then push the staff onward, to ascertain that all is free, and immediately withdraw; next introduce a No. 8 catheter, which should be retained for forty-eight hours; it should then be taken out, and after the lapse of six or eight days the urethra is to be dilated by the introduction of a full-sized catheter every second or third day, according to circumstances. For some little time afterward the urine will escape by the perineal incision; but as the wound heals by granulation, the flow becomes daily less, and finally ceases entirely. The principal points to be attended to in the operation, are:

1. To pass the staff fairly through the stricture, and to be especially careful in determining this, if false passages exist.

2. To make the incision in the median line; as in cutting through the septum, Mr. Syme has observed, there is no danger of wounding any artery of magnitude, which might occur if the knife divided the tissues on either side of the raphe. The only artery endangered by the operation is the artery of the bulb, and this may be avoided by keeping in the mesial line, as the artery lies toward the side of the incision.

3. To enter the point of the scalpel behind the stricture, and divide it by cutting forward in the groove of the staff.

4. To keep the edge of the knife directly in the medial line, and not turn it downward; in doing so, division of the deep perineal fascia will be sure to take place, followed by inflammation and infiltration.

5. To obviate any difficulty in passing the catheter into the bladder after division of the stricture, it has been recommended by Mr. Henry Thompson to pass a broad director, with the groove turned upward, into the posterior part of the urethra, after the stricture has been divided and before the staff is withdrawn. As the catheter passes along the canal, its point, coming into contact with the director, will be guided by it into the bladder.

When there is more than one stricture, that nearest the bladder should be the first operated upon, and generally its division alone

suffices. Miller, of Edinburgh, thinks the operation a very serious one, it having been followed by pelvic abscesses opening into the rectum, causing "a protracted and critical recovery." Fatal cases of perineal section following this operation have been recorded; and the rule laid down by Liston is, that whenever a catheter can be passed through a stricture, its *cure by dilatation* is in the surgeon's hands, and no other operation should be thought of except in those strictures which are in advance of the bulb, when the sub-mucous and spongy structures around the canal are converted into a hard, fibrous mass; or when it degenerates into a fibro-elastic tissue, like India-rubber, which contracts as fast as dilated. In such cases the operation may be performed, and is justifiable. Dr. Jno. P. Mettauer, of Prince Edward Court House, Virginia, says: "I have been treating strictures of the urethra for over thirty years, and I have cured every case, now over four hundred. I incise and dilate, and my modes of operating are intra-urethral, and by the raphe-perineal section. This last mode I first practiced in 1836, during which year I treated two cases upon this plan; and how long before Prof. Syme operated, I leave you to judge. I have living witnesses to prove my operations in 1836." Most surgeons in the United States, and many on the continent, are of the opinion that where it is possible to introduce a grooved director, it is also possible to pass a bougie and relieve the patient by dilatation. Though a few surgeons have been successful in the performance of perineal section, (among whom may be mentioned Dr. Gurdon Buck, of New York, who says he has never met with a case of failure), still the ultimate results, as laid before the profession, do not warrant the operation, except in the following cases:

1. In very *old, cartilaginous* strictures, of half an inch or more in extent, and with great difficulty in passing an instrument, and when the dilatation cannot be carried beyond a certain extent, owing to the conversion of the urethral tissues into a dense, unyielding, fibrous structure, which neither admits of dilatation nor absorption by instrumental pressure.

2. When the above variety of stricture is complicated, with fistula in the perinaeum or scrotum, with considerable plastic infiltration into the tissues.

3. Very dense and tight strictures, accompanied with excessive sensibility of the urethra, each introduction of the instrument caus-

ing intense pain and suffering, followed with more or less constitutional disturbance.

4. Narrow and very elastic strictures, that admit of ready dilatation, but as quickly return, so that the patient is never free from suffering and danger.

To insure success in this operation, the surgeon, in dividing the stricture from below upward, must take care that it be incised throughout its *whole extent*, being careful to avoid wounding the deep perineal fascia. Mr. Syme states that he has "never found it necessary to cut farther back than the bulbous portion, for the conveyance of a full-sized instrument into the bladder," and that he has never met with a constriction posterior to this point. This, however, is not strictly true, for, in a case which occurred in the author's practice, the stricture occupied the *membranous* portion of the urethra, although it is believed such instances are extremely rare. The perineal section was performed as directed by Mr. Syme, and the case finally recovered—not, however, without a little trouble and discomfiture. In the event of inability to pass an instrument through the constriction, either in consequence of disorganization and induration of the perinæum, or a sloughing away of a portion of the urethra, neither the cure by dilatation nor urethrotomy can be performed, and the only recourse left is incision of the stricture without a guide.

Impermeable Stricture.—The operation for this variety of stricture consists, in the first place, in preparing the patient as if for the performance of lithotomy. The surgeon, sitting in front, with a proper-sized catheter in his hand, passes it down to the stricture, holding it firmly by one hand; with the other a bistoury is plunged directly into the raphe of the perinæum, with its cutting edge forward, and as far back as the apex of the prostate, so that the urethra may be opened *behind* the stricture; he then cuts forward through the stricture to the point of the catheter, and, having opened a passage, endeavors to pass the instrument on into the bladder. This is often exceedingly perplexing to accomplish, in consequence of the difficulty in finding the posterior part of the urethra; in some cases, however, assistance may be gained by passing a grooved director, or straight female catheter, into it as a guide. When the tissues of the perinæum are hard and gristly, plastic material is poured out, and inflammation and disorganization have taken place,

with formation of fistulæ, it is exceedingly difficult to keep the track of the urethra. When hemorrhage is profuse, as in such cases almost always occurs, it is one of the most troublesome operations in surgery. The most expert operators have failed in their endeavors to accomplish the purpose indicated, while others have succeeded only after the most prolonged and painful attempts at finding the canal. Fortunately, however, the operation is rarely performed; as by well-directed means, and with the manifold appliances at our hands, we may almost invariably succeed in introducing a staff, however small, into the bladder, which will give us a sure guide for the knife, and certainly permit free access into the urethra beyond. I have no hesitation, therefore, in recommending *urethrotomy* in lieu of division of the stricture without a guide.

The remedies found most efficacious in the treatment of this affection are, *aconite*, *cantharis*, *belladonna*, *camphor*, *digitalis*, *argent nit.*, *nux vomica*, *opium*, *terebinthina*, and *thuya*.

Mr. Yeldham says: "I have had under care cases of stricture which had existed for years, notwithstanding the regular use of the bougie, which, with the use of that instrument for a few times, when at the same time appropriate homœopathic medicines were given, have got completely and permanently well." It is always the best practice to cure the stricture, if possible, by internal remedies and the occasional use of the bougie, rather than rashly resort to an operation which, while it may temporarily relieve, may subsequently imperil the life of the patient. When all these means *have failed*, as a dernier resort the operation is justifiable. The principal remedies in the treatment of strictures are, *aconite*, *cantharis*, *mercurius*, *nux vomica*, and *sulphur*, selecting the appropriate remedy according to predominating symptoms. When much irritation exists in the region of the bladder, with tenderness at the point of stricture, *aconite* and *cantharis*, either alone or in alternation, will often effect most excellent results. When a chronic discharge takes place from the diseased tissues, *mercurius* or *pulsatilla* may be relied upon as curative. If the digestive organs are impaired, and the constitution be scrofulous or debilitated from preceding causes, *nux vomica* or *sulphur* are reliable. As accessory remedies, to fulfill any complications that may arise during treatment, *clematis*, *cannabis*, *calcareæ*, *silicia*, and *thuya*, may be given with much benefit. The remedy must be selected with reference to

its similitum, and should cover, as far as possible, all the symptoms of the case.

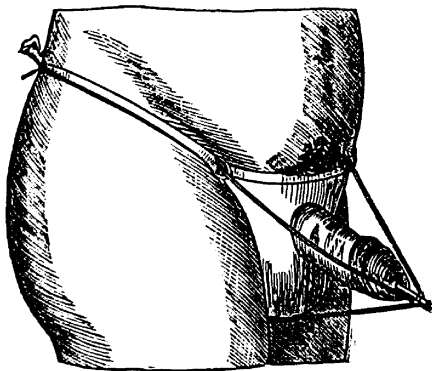
§ 6.—Complications of Stricture.

Retention of Urine.—Among the complications of this disorder, there are none that occur more frequently than retention of urine, produced by the gradual and progressive contraction of the canal. It more frequently occurs as the result of a congestive or spasmodic condition of the parts supervening upon the organic constriction. It is often brought about by the patient, who, having a moderately-tight organic stricture, commits an excess, or becomes exposed to alternations of temperature, particularly the cold and wet, and superadded to this trouble there is a congested condition of the parts, which prevents the passage of urine entirely, or permits it to escape by drops, and with so much pain and straining that the bladder cannot be wholly evacuated. Eventually, in these cases, the retention becomes complete, the bladder fills speedily and rises up above the pubes, producing much distress and constitutional disturbance; and if relief be not promptly extended, the distended portion of the urethra behind the stricture gives way, and extravasation of urine ensues. Under such circumstances, and to prevent so serious a complication, the surgeon is called upon promptly to exercise the function of his art and relieve the already-distended viscus.

Treatment.—This depends entirely upon the severity of the symptoms and the irritability of the patient. If the retention has not existed long, and the patient is not irritable, a catheter should be at once introduced and passed into the bladder. In this the surgeon may succeed more readily than appears at first impression, the stricture frequently yielding before an instrument more readily where retention exists than where there is none. As Sir B. Brodie has demonstrated, it generally happens that if the point of the catheter be only partially introduced within the constriction, even though it does not pass entirely through, upon its withdrawal the urine will flow in a full stream; but if a sufficiently small catheter be used, even less than No. 1, it may oftentimes be introduced into the bladder, after failure has taken place by the use of a large-sized instrument. If the patient is very irritable, and considerable spasmodic action exists at the point of constriction, it is better, before using the

catheter, to place him in a warm hip-bath; or, in the absence of this, administer an enema consisting of a pint of warm starch or flaxseed water and twelve drops of the tincture of *belladonna*, after waiting a few minutes, the introduction of the catheter will often be rendered a comparatively easy task. Should this operation still fail, *chloroform* may be resorted to, and often with a great deal of success. The patient should be brought fully under the influence of the anæsthetic before an attempt to pass the catheter is made. There are no operations in surgery where the beneficial effects of anæsthesia are more strikingly shown than in retention. Under its influence I have never seen a stricture that did not yield to the introduction of a catheter, if the instrument was properly

Fig. 152.



adapted to the diameter of the strictured surface. After passing the catheter into the bladder, it should be permitted to remain, having it secured as is represented in Fig. 152; see page 175. If any constitutional excitement exists, *aconite* will be found advantageous. The patient should be placed in bed, and either one of the fol-

lowing remedies given according to their indications: *apis mellifica*, *agnus castus*, *arsenicum*, *cantharis*, *copaiba*, *terebinthina*, and *plumb. met.*

Copaiba is specially indicated in retentions caused by suppressed gonorrhœa.

Apis mel., when there exists inflammatory irritation of the bladder as the result of a gradually increasing stricture, with burning, constant urging, but inability to urinate; urine hot, red, and even bloody.

Agnus castus, in paralysis of the bladder, caused by retention.

Aconite, *belladonna*, and *camphor*, are eminently serviceable in retentions producing spasmodic contractions.

Arnica, when the retention is caused by mechanical injuries,

falls, sprains, blows, concussions, and the irritation caused by the presence of calculi in the bladder.

Nux vomica, *arsenicum*, *tussilago*, and *digitalis*, are also useful when a paralytic condition of the bladder exists, either as the result of stricture or an enlarged prostate.

Electro-Magnetism.—This will often overcome a spasmodic stricture without the aid of any other means. I have frequently succeeded in overcoming this troublesome affection by applying the negative pole of a battery upon the constriction, or as near to it as possible, and the positive pole to the extremity of the penis, and passing the current through the strictured surface for five or ten minutes. The extract of *belladonna* is another remedy of great value in overcoming this difficulty, and my plan of employing it is to anoint the whole external tract of the urethra with the extract. In a majority of instances the urine will sometimes pass away in an hour or so after the application. If this does not succeed, the constriction may be readily overcome by anointing the catheter with a mixture of the extract of *belladonna* and lard, and gently pushing its way onward to the bladder. In retention from onanism, or venereal excesses, I have found *acid phosph.*, *agnus castus*, *cannabis*, and *digitalis*, valuable remedies.

If, however, it is found impossible to relieve the bladder by the means already cited, recourse must be had to puncture of the over-distended viscus. This is accomplished in one of three ways: 1st, by *forcible catheterism*; 2d, by *making an opening into the urethra behind the stricture*; and 3d, by *puncturing the bladder through the rectum*, or *above the pubes*.

Forcible catheterism is a dangerous and unsurgical procedure, and is exceedingly apt to produce false passages, and in this way complicate rather than relieve the existing difficulty.

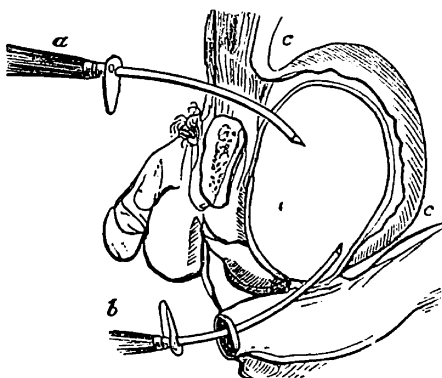
Puncture of the urethra behind the stricture, if the canal is distended by the accumulation of urine and by the straining of the patient, is the safest and best mode of affording relief after the failure of the catheter; but if this is not the case, the operation then becomes both difficult and serious. The manner of performing the operation is to make an incision into the middle line of the perinæum, and open the urethra behind or through the stricture, as described on page 437, for impermeable stricture. In doing this, care must be taken to make the incision strictly in the direction of

the mesial line, so as to avoid *wounding* the vessels that lie on either side. The chief advantage in this operation is that the stricture, by it, may be cured at the same time that the retention is relieved, and also that there is less danger to the patient than when the bladder is opened. Another advantage of the perineal incision in these cases is, that if a urinary abscess has begun to form, or extravasation into the tissues has already taken place without the surgeon's knowledge, it affords an exit for such extravasated matters, at the same time that it relieves the patient from the distress and danger consequent upon the retention. If, as sometimes happens before the surgeon has been called to see the patient, an abscess has already formed, rupturing the urethra, it is not necessary to be so particular about opening the canal; for, an aperture having already been established, the urine will readily flow through the artificial channel thus formed, by free incision into the inflamed or suppurating perinæum.

Puncturing the bladder through the rectum.—The operation of tapping the bladder above the pubes for retention of urine has almost entirely yielded to that of puncturing the walls of this viscus through the rectum. It is generally admissible, readily performed, comparatively safe, affords the most speedy relief, and consequently is the most frequently adopted of all the processes of incising the bladder. Compared with opening the urethra in the perinæum, it has the disadvantage of not aiming at the relief of the stricture, as well as of the retention; but this is in a manner compensated for by the facility with which the obstruction generally yields to dilatation, when once an artificial outlet from the bladder has been established and the urethra is no longer irritated by the passage of urine. The instruments required are an ordinary *grooved* curved trochar and canula, about eight inches in length; the groove indicates with certainty when the point has entered the bladder by the flow of urine that immediately takes place. After evacuating the rectum, place the patient either on his hands and knees, or on his back with his knees elevated, after the manner of preparation for lithotomy, and, bringing him close to the edge of the bed, introduce the left index-finger, well lubricated, into the anus, along the rectum, and feel for the posterior margin of the prostate. This being secured, pass the trochar and canula, which are long and somewhat curved, upon the finger, as a guide, until it reaches the posterior edge of the prostate,

in juxtaposition with the extremity of the finger, then direct it forcibly upward into the bladder, Fig. 153. In introducing the instrument into the rectum, the point of the trochar should be sufficiently withdrawn into the canula, so as to avoid wounding the gut, and not plunged into the bladder until the *point* is pushed out and made to impinge upon the spot where the perforation is intended to be made. The bladder once punctured, the

Fig. 153.



- a. Operation above the pubes.
- b. Operation through the rectum.
- c. Peritoneum.

trochar should be gently withdrawn, leaving the canula within, and sustaining it in position by means of tapes, rollers, and other suitable contrivances. Retaining the canula for a few days *in situ*, every means must be employed to overcome the constriction and restore the parts to their normal diameter as fast as may be, when the canula should be withdrawn and the aperture be permitted to close. In performing this operation, the bladder is perforated in that portion of its fundus uncovered by peritoneum, being bounded *posteriorly* by the reflection of the serous membrane; *anteriorly*, by the prostate; and on either side by the vesicular seminales. To avoid wounding any of these structures, the opening must be made directly behind the prostate, and strictly in the mesial line.

Puncture of the Bladder above the Pubes.—This is done by making an incision through the linea alba just above the pubes; then plunge a long trochar and canula downward and backward into the bladder, where it is uncovered by the peritoneum; retain the canula, keep the patient on his back to prevent extravasation, and lose no time in restoring the natural passage.

§ 7.—Extravasation of Urine.

Extravasation of Urine.—This consequence of stricture, dependent upon rupture of the urethra, takes place in the following man-

ner: A patient who has been long suffering from difficulty in micturition, of a sudden feels a more obstinate spasmodic retention than usual; he rises repeatedly from his bed, and, straining with all his force, finds it impossible to pass his urine. At last, fearful of some unpleasant consequence if the retention longer continues, he makes another violent effort, and, during the muscular contraction, he feels something give way; a little urine passes; the pain of distension is diminished; and, fancying all is right, he seeks repose for the night. The yielding experienced is the bursting of the urethral walls, the urine being forced by the violent contraction into the cellular tissue of the scrotum, perinæum, and groins. Soon the patient is aroused from his fancied security by a smarting and tingling about the anus and perinæum; the urine, putrid and changed by long confinement in the bladder, causes inflammation and sloughing; the infiltrated skin looks red, and soon black spots of gangrene make their appearance. Typhoid symptoms follow; the pulse falters; the skin is clammy; delirium and hiccup come on; and, if the patient is not promptly and properly treated, death closes the scene. A *black spot* on the glans penis, indicating that extravasation has affected the corpus spongiosum, is a sign of approaching dissolution.

Treatment.—The first thing to be done in a case of this kind is to pass a catheter into the bladder, if possible, which generally is readily accomplished, as the stricture almost always relaxes after the bladder has been emptied. If this cannot be effected, make an incision in the mesial line of the perinæum, and, at the same time, free incisions into all parts that are swelled, or emphysematous by the extravasation of urine. The bladder being relieved of its superimposed burden—the extravasated urine being let out by free incisions—the surgeon will treat the remaining conditions as shown under the head of Gangrene.

Urinary Abscess is a frequent consequence of stricture, and may be considered in many cases as a limited effusion of urine mixed with pus and circumscribed by plastic matter that is deposited in the tissues with which the urine comes in contact. It is sometimes occasioned by the irritation of the passage of instruments, but may arise simply as the effect of stricture, or from inflammation of some of the urethral follicles. From some cause of this kind, a small abrasion or aperture forms in the cellular tissue close to the urethra,

and, after a time, opens into that canal; or perhaps one or two drops of urine escape into the subcutaneous cellular tissue in consequence of ulceration of the urethra behind the stricture; and this small quantity of urine, bounded or circumscribed by plastic deposit around it, produces inflammation, by which an abscess is formed, thus preventing the occurrence of extravasation. An abscess of this character may form at any portion of the urethra, but is most frequently met with in the perinæum, taking its origin, as it appears, from the bulb or membranous part. These abscesses are seldom dangerous, but become of importance to the surgeon from their great liability to terminate in that troublesome affection, *urinary fistula*.

The *symptoms* of urinary abscess are indicated by the appearance of a small, somewhat circumscribed, hard, and painful tumor, situated in the neighborhood of the urethra. For the first twenty-four hours there is little or no pain, inflammation not having taken place to any considerable extent; after this, the swelling increases—rapidly, if the abscess extends to the scrotum; less so, if it occupy the perinæum. At this time there is considerable constitutional disturbance, and, if it attain considerable dimensions, pyrexia is apt to ensue. It is principally in the perinæum that the abscess attains any degree of magnitude, where it will be found deep, hard, and painful, but not prominent; without fluctuation, but attended by considerable weight and throbbing in this region, owing to the fact that the abscess is bound down by the superficial fascia covering the perinæum. It does not point as other abscesses.

Treatment.—In the treatment of these abscesses, early opening is required. When occurring in the scrotum or anterior to it, the surgeon should wait until fluctuation is felt; but when seated in the perinæum, *prompt* action is demanded by making a free incision into the hard, brawny mass, thus rescuing the patient from the gates of death into a stage of comparative health. After evacuating the contents of the abscess, it should be poulticed and otherwise treated as advised in the treatment of abscess, page 261. As soon as the patient is sufficiently improved by treatment, it will also be expedient to overcome the constriction and pass a catheter into the bladder. The steps of this operation are the same as those already stated under the head of Stricture and Perineal Section, and their modes of cure.

‡ 8.—Fistula in Perinæo, or Urinary Fistula.

These fistulæ are the consequence of urinary abscess and extravasation, and signify an opening from the perinæum into the urethra, through which the urine passes away during the act of micturition. They are sometimes met with in the groin, inside of the thigh, and in the anterior abdominal wall. When occurring in the scrotal and penile portions of the urethra, they are usually single; but when in the perineal, they are often numerous. Civiale, in one case, counted fifty-two openings. Like other fistulæ, they differ in size, tortuosity, diameter, etc. The surrounding parts are thickened, the scrotum and penis become enormously enlarged, indurated, and almost cartilaginous in structure. Sometimes the urine escapes entirely through these openings, none passing out by the natural channel.

Treatment.—The treatment of urinary fistulæ varies according as it is complicated with stricture, and as it is situated in the anterior or posterior parts of the canal. The first and most essential measure is to restore the urethra to a healthy state, and to dilate the stricture, if not too tight and hard, by means of bougies or sounds—introducing the instrument every second or third day until the urethra attains its normal size, when the fistulæ will, in many cases, get well without any further treatment. From the irritation that sometimes follows the frequent introduction and withdrawal of the catheter, it will be found advantageous to permit the instrument to remain within the canal. In adopting this practice, a *moderate-sized* elastic catheter should be employed; if it be too small, the urine will flow out between its sides and the urethra, and thus escape through the fistula; if it be too large, it stretches the urethral orifice of the fistula injuriously.

If the stricture be tough and irritable, the better plan is to perform urethrotomy immediately. By doing so, all obstruction is at once removed; the urine has free exit by the new aperture, rather than being driven through the tortuous and sinuous passages of its own making.

If the fistulæ are recent and small, they will generally heal kindly after the removal of the obliteration; but if they be tough, old, and cartilaginous, they are little disposed to take on reparative action, and require special treatment. The special treatment for

urinary fistula varies according to its *size* and the *part* of the urethra with which it communicates, whether *perineal*, *scrotal*, or *penile*.

Perineal fistula, of *small* size, may be cured by injections of *nitrate of silver*, *nitric acid*, *corrosive sublimate*, *calendula*, *hydrastis*, or any of those agents that stimulate granulation. The external orifice should not be permitted to heal before the whole track is closed; otherwise fresh abscesses will form. If *large*, a gum catheter should be retained in the bladder, and the edges of the fistula rubbed daily with the nitrate of silver, or one of the other remedies given above; or they may be pared deeply and be coaptated by the quill suture. In extreme cases, the urethra must be laid open.

Scrotal fistula.—This species of fistula requires to be laid open by a free incision, and granulation induced from the bottom, where communications take place with large, sloughy, and ill-conditioned cavities in this situation.

Penile fistula is usually troublesome to heal, its edges being thin and its track short and narrow. The same general constitutional and local treatment as advised under the head of Ulcers, obtains in the treatment of these affections. Generally they are tedious and troublesome to heal, and test the patience and skill of the practitioner in a variety of ways.

§ 9. — Prostatitis.

Etiology.—Inflammation of the prostate may be caused by the forcible introduction of instruments along the urethra, from excessive coitus, irritating injections, stricture, or stone in the bladder; but the most frequent cause is gonorrhœa. It never occurs during the first two weeks of the gonorrhœal inflammation, and is rarely met with in persons under twenty-five or thirty years of age. It rarely occurs as an idiopathic disease.

Symptoms.—The earliest symptoms of prostatitis are, a deep-seated pain in the perinæum, a frequent desire to urinate, with a burning sensation accompanying the escape of urine, together with pain during defecation, especially if the bowels be at all constipated, which is commonly the case. Rectal exploration will

show an enlargement of this organ, which becomes exquisitely tender to the touch.

It may terminate in resolution, suppuration, or in gangrene, though the latter termination rarely occurs. The formation of prostatic abscess is not always marked by well-defined symptoms, though it may be strongly suspected after a week or ten days, provided there be rigors, followed by febrile reaction.

Diagnosis.—The diagnostic signs by which it can be distinguished from cystitis, with which it is liable to be confounded, are thus stated by Bumstead:

1. By far the greater degree of constitutional disturbance—general febrile reaction being a much more frequent attendant of inflammation of the prostate than of the bladder.

2. The pain in prostatitis is more of a throbbing and bearing-down character, is chiefly confined to the perinæum, and is less prone to radiate to the extremity of the penis, and elsewhere, than the pain of cystitis.

The chief means, however, of distinguishing these diseases is to be found in physical exploration.

3. In prostatitis, the finger introduced *per anum* will detect the sensitive and swollen gland encroaching upon the rectum, and extending in some instances higher than the point of the finger can reach. In cystitis, introduction of the finger within the anus may be painful, in consequence of the inflammation extending to the recto-vesical wall, but no tumor can be felt.

4. In prostatitis, the passage of a catheter is attended with great pain, and meets with obstruction in the prostatic portion of the urethra, and when it enters the bladder a large amount of urine escapes. In cystitis, there may be some obstruction to catheterism, but this is situated at the vesical neck, and the bladder is found to be nearly empty of urine, since the extreme irritability of its walls does not permit any large collection.*

The treatment of the acute and chronic varieties, being based upon the same general principles, will be given after the consideration of these varieties.

* Bumstead on Venereal Diseases, p. 155.

§ 10.—Chronic Prostatitis,

Unlike the acute form of this affection, is rarely traceable to gonorrhœal inflammation, but is more frequently due to onanism, excessive sexual indulgence, or sedentary habits. It is most common in young men of sedentary life, or who have been addicted to masturbation.

Symptoms.—The most prominent symptom is an occasional, or perhaps an almost constant, escape of a viscid, ropy mucus, the morbid secretion of the follicles of the gland, and which is generally supposed by patients to consist of semen. The absence, however, of spermatozoa, as shown by microscopic examination, is sufficient to determine its true character. This discharge is commonly noticed in the morning upon rising, when at stool, and immediately after micturition. It is also likely to occur after an erection, or may be produced by mental excitement alone. It is the source of the most depressing and gloomy forebodings. The patient is constantly harassed by the dread of impotence, is disposed to exaggerate every symptom, imagines he is losing his mental and physical powers, and is often led to contemplate suicide. Aside from the mental anxiety, there is more or less headache, of a congestive character, dyspepsia, and a constipated condition of the bowels. There is a frequent desire to pass water, accompanied by more or less scalding, the last drops dribbling away, or being expelled only by considerable effort. There is a burning pain in the perinæum, especially after sitting, with more or less uneasiness in the thighs and lumbo-sacral region. The great irritation about the anus is often attended by hæmorrhoids or eczema. The most serious feature of this affection, however, is the nervous irritation which it produces, sometimes almost wholly unfitting the patient for mental or physical labor. It never terminates in suppuration, nor in chronic enlargement such as is met with in old men.

Treatment.—It must be borne in mind during the treatment of this disease that it is more obstinate than serious. The first and great indication is to unburden the patient's mind of its despondency, which will accomplish much by way of restoring the tone and normal activity of the general system. He should be fully assured of the non-contagious character of the discharge and of the im-

probability of his becoming impotent. He should be advised to mingle freely with his associates, and to read or write, or engage in anything that will tend to detract his mind from a contemplation of his unfortunate condition.

In the acute variety, the patient should be placed in the recumbent position, unstimulating diet ordered, and the constant application of medicated lotions to the perinæum, together with those remedies that are the most appropriate to the diseased condition. These consist of *aconite*, *belladonna*, *cannabis*, *iodium*, *mercurius*, *phosphorus*, *pulsatilla*, *sulphur*, and *thuya*. When fever coexists with inflammation of the prostate, *aconite* should be given, either alone or in alternation with *mercurius*, and continued for two or three days, or until manifestations of a change for the better take place. It must not be forgotten that this affection is exceedingly obstinate; "and no good will arise," says Yeldham, "from a frequent change of remedies, even though little or no progress in the cure seems to be made. We are apt to overlook the character of the disease and to be impatient to obtain decided and striking effects. Such effects do undoubtedly follow in many acute diseases; but if they are expected in the affection now in question, the expectation will almost infallibly be disappointed. The patient should be warned at the outset of the attack that it will probably be tedious. He will then submit with greater calmness and resignation to the necessary treatment, and the surgeon will be spared the harassing anxiety to which he would otherwise be exposed on account of the seeming inertness of his remedies."

After *aconite* and *mercurius* have been persevered in for a few days, and the fever has partially subsided, *mercurius* may be given alone two or three times a day, and followed, if no improvement take place, by *pulsatilla*. I have found it an excellent plan to alternate the *mercurius* and *pulsatilla* every three or four hours, after the fever has been subdued by *aconite*, and administer a dose of *aconite* at bed-time. Yeldham recommends that, "instead of alternating medicines every dose, it is often preferable to give one kind during the day and the other during the night. Medicines," he continues, "are less interrupted in their action, and each one has a better opportunity of producing its specific effect when given in this way than when changed more frequently;" and this is generally the result of my own observations.

After the more active symptoms have been subdued by the use of the foregoing remedies, and the disease remains in a sub-acute and chronic condition, *kali hydriodinum* may be given with great benefit; but to be productive of such results, it must be given in appreciable doses—that is to say, one-grain doses of the salt every four or five hours, according to circumstances. *Aurum*, *argentum*, *calcareæ*, and *thuya*, are valuable, according to their pathogeneses. If suppuration takes place with formation of an abscess, it should be encouraged by the application of fomentations, poultices, etc. It is a good plan to anticipate the breaking of the abscess by an artificial opening. If the abscess points toward the perinæum, an incision should be made in the most prominent part of the swelling, with a long, straight, narrow-pointed bistoury, care being taken to avoid the rectum on the one hand and the bladder on the other. If the abscess should point in the rectum, it may readily be reached with a long, curved trocar. For some days after the operation, it is advised that the bowels be kept as quiescent as possible.

When the abscess stretches toward the urethra and neck of the bladder, it may be opened by a common silver catheter; or, in lieu of this, a sound with a conical beak and a small curve may be used. When the abscess is not yet completely matured, and delay would be improper, the operation may be done by the lanceted stylet. During these processes the urine should be frequently drawn off with the catheter. The after-treatment of these abscesses will be the same as recommended under that head, page 261.

§ 11.—Gonorrhœal Ophthalmia.

Gonorrhœal inflammation of the eye may attack either the conjunctiva or the sclerotic. Fortunately, this disease is not of very frequent occurrence, as it often occasions entire destruction of vision, notwithstanding the early and skillful attempts made to arrest its progress. The especial danger to be apprehended arises from the formation of ulcers on the cornea, and sloughing of the tunics of the eye.

Etiology.—It has been a disputed point whether this form of ophthalmia is due to the direct application of the specific discharge to the eye, to metastasis, or to sympathy. As regards the former

mode of origin, there can be no doubt that it is, with few exceptions, the only mode by which the disease is communicated. Cases are reported, however, which, from the circumstances, were apparently dependent on some other cause than direct contact with the virus; still, the cases recorded are not sufficiently numerous to establish its metastatic or sympathetic character. Bumstead regards these cases as "merely a manifestation of gonorrhœal rheumatism, which, like ordinary rheumatism, may attack several of the ocular tissues" *—a supposition receiving much weight from statistical authority, it being shown that in about sixty cases, collected by various writers, all were preceded, attended, or followed, by rheumatism consequent on gonorrhœa.

Symptoms.—The disease is most frequent during the decline of gonorrhœa, though it may occur at any stage. It usually attacks one eye alone at first, presenting the ordinary symptoms of conjunctival inflammation: there are itching and swelling of the eyelids, a redness of the conjunctiva, a muco-purulent discharge, with profuse lachrymation. The disease is rapid in its development, attended by intense pain upon the least motion of the inflamed surfaces, and may terminate in ulceration of the cornea, which is the chief difficulty to be feared.

Diagnosis.—The diagnosis will depend entirely upon the history of the case, as there are no positive signs by which it can be distinguished from purulent conjunctivitis.

Treatment.—This affection, one of the most destructive forms of ophthalmia, must be treated promptly and actively. If the patient is seen early in the disease, *aconite* and *belladonna*, given internally, if there be fever or high local action, and *belladonna* alone, or conjoined with *mercurius*, if none, with lotions of *belladonna* or *euphrasia* constantly applied to the eye, are often of exceedingly great benefit. If these means do not succeed in controlling the affection, recourse must be had to topical applications of the *nitrate of silver*, *nitrate of mercury*,† or *corrosive sublimate*. These agents are more speedily curative in obstinate cases than any remedies hitherto employed. They have been much used by European

* Bumstead, op. cit. p. 191.

† I have frequently used this remedy with marked success when the nitrate of silver, from some cause or other, ceased to have a salutary effect.

surgeons, and are largely used at the present day as the most reliable remedies we possess in the cure of this affection. . In regard to the strength of these solutions, surgeons differ. The Germans especially recommend the *nitrate of silver* to be used in the solid form, while others advise its use in solution of various strengths, from five grains to a dram, in an ounce of distilled water. Mr. Wharton Jones treated his cases most successfully by a solution of four or five grains of the *nitrate* to the ounce of water, which plan I have uniformly adopted with the most satisfactory results. The mode of using this solution is by dropping four or five minims into the inner canthus of the eye twice in twenty-four hours, keeping the lids well covered in the interval by compresses dipped in medicated lotions of *belladonna*, *euphrasia*, or *hydrastis*, as either may seem most appropriate. The purulent discharge should be carefully washed away as fast as it accumulates, by a very fine sponge or shreds of soft old linen. In doing this, caution must be observed that the discharges do not come in contact with the eyes of the surgeon or nurse, as it is of a highly-contagious character, and will almost to a certainty reproduce the same disease. Cases have been recorded in which the attendant's vision has been destroyed by neglecting proper precautionary measures. During the entire treatment, the patient should be kept in a dark room and on a strict antiphlogistic regimen. If *chemosis* be considerable, the conjunctiva must be incised by snipping up a portion with the forceps and cutting it off. The *belladonna* lotion will be found exceedingly efficacious after this procedure; and the *nitrate of mercury* lotion, if employed, should be gradually discontinued. Other applications of value in this affection, as topical expedients, are—

Cuprum sulph.—This agent, holding high rank as one of the best local specifics, should be used in substance, a small piece of which is to be smoothly polished and rubbed lightly over the inflamed surface, once or twice a day—bathing the parts after each application with a camel's-hair brush filled with pure water. I have often used this remedy in purulent ophthalmias of children with the most gratifying results. Next to the nitrates of mercury and silver, I hold it to be one of the best local specifics. An elegant and useful preparation of this salt has recently been introduced to the profession in the form of cylindrical sticks, resembling in form those of the nitrate of silver.

Mercurius corros.—With this remedy I have often succeeded, when other agents failed, in making decided and excellent cures. My plan is to precede its use with four or six applications of tepid *hamamelis* lotion, one part to ten of water, two or three hours apart; then follow with a solution of the *bichloride of mercury*, from one-eighth to one-tenth of a grain in an ounce of rain-water; after which cover the external parts by a light elm poultice medicated with *hamamelis* water, and constantly applied warm, and renewed as often as desirable. As a substitute, or rather alternate, for this poultice, a cataplasm of alum curd may be used. This is prepared by agitating a small lump of alum with the white of eggs, turned into a cup and continually stirred until a thick pasty mass is produced.

Internally I administer the *iodide of mercury* from the sixth to the twelfth potency, every four or six hours, according to the severity of the symptoms. In this way I have frequently succeeded in curing this intractable affection when all other means had failed. The impression made by the bichloride upon the tissues is both decided and rapid; it quickly allays pain, diminishes the acrid secretions, and soon restores the parts to a healthy condition. In all cases of copious puriform deposit, it is an excellent remedy.

It is exceedingly difficult to examine the eye in this affection, owing to the excessive tumefaction of the lids. To accomplish this object satisfactorily, *first syringe well the eye* with tepid water; then place the child's head between the knees, and gently, with the index-fingers, draw the lids apart—not with the view to eversion, for that is impossible, but merely with the intention of examining the condition of the eye and the progress made toward degeneration of the tissues.

Dr. G. W. Pope, of Washington, D. C., reports several cases of purulent ophthalmia-neonatorum “cured by the alternate administration of *rhus*. (1), and *merc. cor.* (2), and occasionally *hepar* (1), aided by local applications of weak solutions of *tartar emetic* during the first few days, and, subsequently, equally weak solutions of *alum*. Although some of these cases,” he adds, “when submitted to treatment, presented enormous œdema of the lids, with intense inflammation of palpebral conjunctiva, and profuse yellow or greenish purulent discharge, still no lesion of the cornea occurred, and all recovered from the eighth to the thirteenth day.”

Having enjoyed considerable reputation in the successful treatment of this affection, my own experience is in favor of prompt and energetic local measures from the first, as previously directed. In only one patient, in over a score of cases treated, did degeneration of the cornea take place.

Dr. Wolf recommends the use of *thuya*, though he only employed it in a few cases; *apis* and *aconite* are also proposed, and instances of success with these last two remedies are noticed. *Arsenicum* is valuable in the second stage, or where all inflammatory action has subsided, with scalding, burning pain in the lids, with suppuration more or less intense.

Digitalis, when pain in the eyes is tensive and severe. It has been alternated with *mercury* with good results.

Argent nit., from the second to the sixth potency, has been praised as an internal remedy, but the results of its administration, so far as my experience goes, have been of little value. I believe its chief efficacy consists in its action locally upon the diseased organ. It attacks and overcomes the disease at this point by inducing an inflammation of a similar type, which subdues the pre-existing trouble; thus thwarting the localization of the sycotic poison, first in the appendages, and secondly in the internal structure of the eye itself.

Acidum nit. is valuable when the anterior chamber of the eye seems filled with a dirty-looking pus, as if disorganization threatened.

Tussilago pet. has been found efficacious in exceedingly inveterate cases.

Professor J. C. Morgan, of Philadelphia, reports to me a case of gonorrhœal inflammation in a child, with intense photophobia and almost complete destruction of the cornea, cured by *very* high potencies of *cham.* and *sulphur*, and an interpolated dose of *gels.* of corresponding strength.

Aurum, hepar, colchicum, and *sulphur*, also fulfill valuable indications in the treatment.

Other remedies of value in the constitutional treatment of this affection are, *euphorbium, apis mel., cannabis, conium, aurum, lyc., calc., baryta, sepia, staph., sulphur*, which may be used either singly or in alternation, selecting the remedy in regard to the cause as well as the symptoms of the disease.

§ 12. — Venereal Warts.

Venereal warts are a papillary growth, identical in their nature with the warts so commonly seen on the hands of children, and frequently supervene upon an attack of gonorrhœa. They are a form of epithelioma occasioned by hypertrophy of the epithelial cells, and are most frequently seen in persons affected with balanitis, gonorrhœa, chancroid, or syphilis. They are not, however, strictly speaking, venereal, notwithstanding they are more common during the presence of diseases arising from sexual indulgence. Their appearance is due to some acrid secretion which irritates the skin or mucous membrane, but which may result from other sources than venereal affections. In the male, they form around the corona glandis, upon the internal surface of the prepuce, or upon the margin of the meatus; in women, upon the vulva, or near the carunculæ myrtiformes; while they are also found in the vicinity of the anus, especially in persons of sedentary habits.

Treatment.—If large, they should be removed with the scissors, afterward cauterizing the raw surface; or they may be entirely destroyed with caustic; by an application of the ligature, or the small ecraseur. *Nitric acid* or *chromic acid* will be found the most serviceable of the caustics. The latter, however, should be used with care, as it is very powerful, and may produce severe pain and troublesome inflammation. A solution of forty grains to the ounce of water will be found sufficiently strong. It has been highly recommended by Marshall against obstinate warts, and especially the pointed fig warts, after excision and caustics had failed. He diluted the chromic acid with equal parts of water, and dropped it with a pointed stick on the excrescences. After four days the warts were removed. By rubbing it a week afterward, all particles will be detached piecemeal.

Tannic acid, *acetate of lead*, or equal parts of *savin* and burnt *alum*, will be the most serviceable of the astringents.

Thuja tinc. is the most valuable remedy of the materia medica for warts on the mucous surfaces or about the anus. It should be applied frequently, with a brush; or it may be somewhat diluted and kept in contact with the wart by the use of saturated lint. It may also be given internally, from the 3d to the 30th. Prof. J. C.

Morgan thus writes: "Several cases of venereal warts or excrescences have been cured in the clinic by *thuya* (1000), and *nitric acid* (5000), the latter after *mercury* had been used allopathically.

Thuya is suitable for those condylomata that are developed during an attack of gonorrhœa, whose bases are flat and broad, which are not humid at first, but become so after the lapse of several days. It should be applied both externally and internally.

Acid nitric has a special relation to pediculated condylomata, which bleed readily, and by their rapid growth are apt to induce phymosis. During the use of the remedy, their bases may be touched with *nitrate of silver*, until the granulations are entirely destroyed.

Cinnabar is also an excellent remedy for the condylomata which are developed from chancres, particularly when they bleed at the slightest touch and are pediculated.

Sabina is an invaluable remedy, and takes equal rank with *thuya* and *nitric acid*. After failure to effect a cure by the two latter, *sabina* has been effectual in destroying the morbid growth.

Acid phosph., *lyc.*, and *staph.*, are also recommended in this affection, and particularly when the condylomata assume the appearance of figs.

Geranium mac. is an important remedy for this affection, applied both externally and internally, in those cases where there exists a mercurial complication. In pure, unmixed syphilitic disease, I have found but little benefit in its action on these excrescences.

Phytolacca decandra.—The lower dilutions of this drug are sometimes productive of rapidly curative effects in warty excrescences, especially when they are associated with both syphilitic and mercurial poisoning, as has been demonstrated by previous attacks of syphilitic rheumatism, periostitis, nodes, etc. For syphilitic and mercurial degenerations, in my hands it has produced good results.

Rhus glabra * is recommended for warty excrescences; and "the juice," (expressed?) says this author, "cures warts and tetters." My plan is to treat these excrescences constitutionally, as syphilitic degenerations, with the *bichloride* or *iodide of mercury*, third or sixth trituration; and locally, excise them and rub the base freely with the *nitrate of silver*, *acid nitrate of mercury*, *chromic* or *nitric acid*, dressing the surface between each application with

* Hale's New Remedies, page 869.

carbolic acid lotion, or some of the chlorinated washes; and in this way very little difficulty is experienced in getting rid of these little pests.

§ 13.—Phymosis.

The term *phymosis* is applied to that condition of the penis in which it is impossible to retract the prepuce behind the glans. The prepuce is elongated, and extends beyond and covers in the glans, at the same time contracting it and preventing the proper exposure of the organ, Fig. 154. This may be either congenital, or acquired

Fig. 154.



as the result of gonorrhœal or other disease. In the *congenital phymosis*, the penis is usually somewhat atrophied, and the development of the glans prevented by the pressure of the narrow prepuce. A remarkable instance of congenital phymosis is recorded in the register of the New York Hospital. The patient, Joseph Smith, of Prussia, was admitted into that institution October 19, 1862. Dr. Stevens removed the free portion of the prepuce, which was found attached to the margin of the meatus instead of the base of the glans, and formed a tubular prolongation of the urethra nearly an inch in length.

Mr. Jonathan Hutchinson * has proven by statistics that syphilis is much less common among Jews than among Christians, which is doubtless due to the practice of circumcision among those people. At the Metropolitan Free Hospital, London, the proportion of Jews to Christians who availed themselves of the treatment of this hospital was nearly one to three, yet the ratio of syphilis in the former as compared with that of the latter sect was only one in fifteen; and that this disparity was not due to their superior chastity is evident from the fact that the Jews furnished nearly half the cases of gonorrhœa that were treated during the same period. Mr. Hutchinson's observations also led him to believe that hereditary syphilis is much rarer among the children of Jews than Christians. This is corroborated by the experience of surgeons, that persons with a long prepuce, and especially those affected with congenital phymosis,

* *Medical Times and Gazette*, Dec. 1855.

are peculiarly subject to venereal diseases. In the majority of cases, this condition is simply a source of inconvenience, but may become a source of disease from the retention of the sabaceous secretion of the part, giving rise to irritation and repeated attacks of inflammation. It especially becomes a source of inconvenience if any gonorrhœal or venereal disease is contracted, as it renders the exposure of the diseased part difficult, and sometimes impossible, and interferes with the necessary treatment. Phymosis that is acquired is usually the result of repeated attacks of inflammation, or of specific disease in the part, giving rise to œdema and false hypertrophy of the prepuce.

Symptoms.—The symptoms of congenital phymosis are: balanitis, constant itching and even pain at the head of the penis, inordinate excitability of the genital organs, frequent erections, erotic dreams, seminal dreams, imperfect development of the penis and testicles, incomplete and painful ejaculations of the sperm, vesical tenesmus, incontinence of urine, gastralgia, neuralgia, and general lassitude and prostration.

Vermeuil reports an interesting case in which careful microscopic examination of the excised prepuce showed that the terminal plexus of nerves had become hypertrophied, which accounted for the nervous phenomena experienced in the patient before excision.

Most commonly, phymosis is the result of venereal disease; sometimes it is occasioned by a peculiar thickening of the mucous membrane and sub-mucous tissue; after cicatrization of a chancre or chancre, it then consists of a simple hypertrophy of the normal tissues of the organ.

Treatment.—The treatment of phymosis, when not congenital, must be conducted in accordance with its cause: thus, if it be the result of inflammation, this must be subdued by the remedies already spoken of in that form of disease; if from venereal disease, the difficulty may be relieved by a well-directed homœopathic treatment, and the necessity of an operation be obviated.

The remedies most appropriate to meet this condition, are, *cannabis*, *cinnabar*, *merc. sol.*, *rhuis.*, *thuya*, *sulphur*, and *viola tri-color*; when it has been produced by excessive coitus, or by friction from the pantaloons, *arnica*, both internally and externally, will be found beneficial. If, however, the inflammation is violent, and the swelling considerable, *aconite* is an important

remedy. When the disease has been caused by uncleanness, injections of *hydrastis* or *calendula* should be thrown into the preputial orifice by means of a syringe, and the parts within be thoroughly cleansed; afterward, pedgets of lint, wet in *aconite* lotion and applied to the penis, will be found exceedingly serviceable. The injections should be used five or six times a day, and care be exercised that the medicated lotions be thrown well up the inside of the prepuce. *Mercury* or *thuya* will be found of advantage in this condition, and a few doses of either will generally be found sufficient to effect a cure. It is rare in phymosis produced by inflammation or specific disease that it ever takes on gangrenous inflammation; when such is the case, the treatment will be substantially the same as laid down under the head of Gangrene. If these remedies should not effect a cure and the disease continue intractable, it may be necessary to puncture the prepuce with a tenotomy knife, for the purpose of permitting the contained matter to escape; then apply medicated lotions of *calendula* to the part, completely enveloping the penis, and renew them frequently. For the induration that sometimes remains after inflammation has subsided, *sepia*, *sulphur*, or *puls.*, will be found beneficial. If there is a suspicion of chancre or chancroid under the prepuce, whose existence is highly probable from the fact that the patient has been exposed in promiscuous intercourse, an operation may be followed by inoculation of the edges of the wound and consequent complication of the affection. The administration of *mercurials* internally, as directed under the head of Chancre or Chancroid, with frequent lavements of the internal membrane of the prepuce, will suffice to heal it, as in those cases where such degenerations occur elsewhere.

Operative Procedure.—When the phymosis is due to acute inflammation, operative procedure should be delayed, and, if possible, deferred altogether, and the case be conducted to a favorable termination by the use of agents internally and locally applied, to which should be added rest in the horizontal position, low diet, etc., etc. If it is certain, however, that no chancroid is present, it is well to scarify the parts internally by means of a delicate knife and a small director, passed under the prepuce, if the affection becomes intractable to the remedies; but if gangrene set in, *arsenicum* and *lachesis* become the sheet-anchors of hope, and may be confidently

relied upon to effect a cure. The rule is, in *accidental* phymosis, avoid an operation; but in *congenital* phymosis, operate.

If, however, the phymosis be congenital, or if it be acquired but permanent, the better plan is to make an operation; and, indeed, in all cases of congenital phymosis in children, I advise an operation, for the two-fold purpose of cleanliness in the parts in after life and the preservation of health.

The operation for this affection may be conducted in two ways: 1st, by slitting up the elongated and contracted prepuce; and 2d, by circumcision.

Slitting the prepuce.—This is effected by passing a grooved director, well oiled, within the prepuce as far as the base of the glans, along its middle line; then, with a sharp-pointed bistoury, follow the groove of the director to the corona glandis, transfix the prepuce, and slit it up in front; the edges of the wound being afterward brought together by several points of the interrupted suture, as shown in Fig. 155. The angles of the flap become gradually rounded off, and ultimately assume an unseemly appearance. A better operation than this is the method of Cullerier, which consists of dividing the tightened mucous membrane at three or four points by a delicate pair of scissors, the pointed blade of which is thrust into the connecting cellular substance, and carried as high up as the fold of the prepuce, while the probe-pointed blade glides harmlessly over the head of the penis. By this operation, the contracted condition of the lining membrane of the prepuce is divided and the constriction of the preputial orifice overcome. The parts should then be dressed by the *calendula* or *hypericum* lotions, continually applied, and treated on the same principles as a common sore. If a chancre is developed within, the same methods of cure should be adopted as advised under that head.

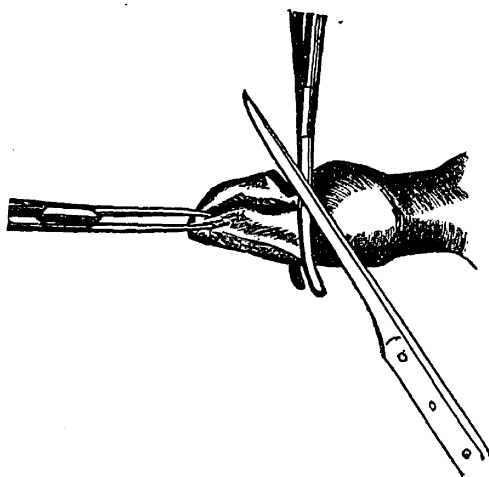
Fig. 155.



Circumcision.—If the selection of the method of operating is entirely in the power of the surgeon, the advantages of the latter plan should receive due consideration, and, as a general rule, should be preferred. To obviate the cicatrization of the wound, which is apt to leave a constriction of the mucous membrane according to the plan usually practiced, I would recommend the Jewish plan of operating, which consists of excising the skin by drawing the pre-

puce forward in advance of the extremity of the glans; then seize the projecting prepuce with a pair of narrow-bladed polypus forceps, and, with one sweep of the bistoury, cut off all that portion of pre-

Fig. 156.



Circumcising the prepuce.

puce which projects beyond the forceps, as is shown in Fig. 156. A circle of skin is now removed, but the mucous membrane lining it will be found to grasp the glans tightly. To relieve this, the mucous membrane is slit up longitudinally on the dorsum of the penis, by a pair of scissors, the probe point of which glides over the glans, the sharp pointed blade entering the connecting tissue be-

tween the skin and mucous membrane; then cut off the angles of these flaps, snip across the frænum, turn back the mucous membrane, and attach it to the edge of the skin by five points of suture, two on each side and one at the frænum. The hemorrhage is slight, and I have never found it necessary to use the ligature, although some authorities advise doing so. Union readily takes place by dressings of calendula, and a very narrow line of cicatrix is left, which in no manner inconveniences the patient.

Dr. T. G. Comstock, of St. Louis, furnishes me with a new process of treating this affection, first proposed by Dr. Elliott Cones, Assistant Surgeon U. S. A., which is a new and ingenious method of overcoming phimosis without the cutting process heretofore described. It is of much value in cases complicated with syphilis, when the edges of the incision, as ordinarily practiced, are so prone to take on the specific disease. The process of overcoming the constriction is by mechanical dilatation, which consists in introducing within the tightened ring the closed points of an ordinary spring forceps. A few minutes' manipulation produces a sensible enlargement of the stricture, which is perceptibly augmented by assiduously

fomenting the parts with cloths dipped into warm water and wrapped around the penis. A relapse of phymosis may be prevented by the occasional introduction of the forceps and stretching the folds of the prepuce. Dr. Comstock has devised a pair of callipers for this purpose, the blades being three inches long, flat, and probe-pointed, beveled on their outer edges, and the blades made to open by means of a screw running through one blade and abutting against the other.

It is quite remarkable to what an extent the prepuce may be dilated by applying the force as above described; it simply requires a little patience and diligent fomentation of the parts. Dr. Comstock reports that he has treated two cases in this way with perfect success. The procedure deserves a trial; and if cutting can be avoided, especially in those cases of concealed chancre, it is indeed an important desideratum to the practitioner.

§ 14.—Paraphymosis.

In paraphymosis, the extremity of the penis is strangulated by a narrow preputial orifice retracted behind the prominent corona glandis, which forms the chief obstacle to reduction, Fig. 157. This accident principally occurs in boys, or in individuals who have a naturally tight prepuce, and who, on uncovering the glans, find it difficult to return it again. It is the reverse of phymosis, and is always an accidental occurrence, and often induces great suffering, and sometimes mortification of the strangulated glans. After strangulation takes place, the parts in front of the stricture become swollen from infiltration of serum and fibrin; the constricting ring is concealed in a deep furrow, and is still farther depressed by adhesions to the deeper textures—the result of inflammatory action.

Fig. 157.



Paraphymosis.

Treatment.—The treatment of this condition is first to try and reduce the swollen organ. This may often be accomplished by seizing the body of the penis between the index and middle fingers of either hand, then endeavor to draw the prepuce forward at the same time that the glans is compressed between the two thumbs

and pushed back, as is shown in Fig. 158. The parts in front of the stricture should be well oiled, and the glans enveloped in a thin rag, for the purpose of a firm support. Steady perseverance by

Fig. 158.



Reduction by Taxis.

this plan will rarely fail of success when reduction is possible. Dr. Van Dommelen has compressed the glans by winding around it a strip of adhesive plaster half a yard long and about a quarter of an inch wide, commencing at its base and terminating near the orifice of the urethra.

M. Seutin has invented a pair of forceps for reducing this strangulation, made with spoon-shaped extremities, which maintain compression of the glans until the constricting ring can be drawn over them.

If reduction cannot be effected by these various plans, the constricting ring must be divided. This is effected by the retraction of the skin of the penis, by an assistant, as far back as is possible toward the pubis; then the operator draws the penis forward so as to display the seat of stricture; this being done, he either nicks it with a bistoury by cutting from behind forward, or by introducing a narrow, sharp-pointed bistoury flatwise under the stricture and turning its edge upward. Another method is to make vertical incisions through the prepuce from above downward, and from the mucous membrane to the skin, until the constriction is freely removed. This latter operation, by enlarging the prepuce, prevents a reproduction of the disease.

The late Abraham Colles, Professor of Surgery at the Royal College of Surgeons, in Ireland, succeeded, after failing by other means, in relieving two severe cases of paraphymosis by passing a director beneath the stricture from before backward, and elevating it upon the point of the instrument, while the stem was made to compress the swelling in front and gradually force it back beneath the stricture. This process was repeated on each side of the penis, after which reduction was quite easily accomplished.

Calculi in the Prepuce.—When the prepuce is very long and narrow, *calculous concretions* have been known to lodge within its folds. They are usually composed of uric acid, and vary in size

from a mustard-seed to that of an almond. Their shape is ovoidal or spherical; surface, rough or smooth; and in color, of a grayish or pale ash. They are formed directly from the urine, and become entangled in the folds of the prepuce, where they remain and sometimes create more or less trouble. A ready and easy manner of getting rid of these bodies is to incise the prepuce. If the parts be greatly hypertrophied, the necessary retrenchment is effected immediately after the extraction.

SECTION III.

GONORRHOEA IN WOMEN.

Symptoms.—Gonorrhœa in women is less severe than in men, although the membrane affected is much more extensive, and the disease of longer duration. The *ardor urinæ* so characteristic in the male is not met with in the early stages of the disease in the female, as the urethra is not implicated until some time after the inflammation has manifested itself in the vulva; and not unfrequently the urethra is not affected at all.

At first the discharge is transparent and mucous; as the disease progresses, however, it gradually becomes purulent, then ichorous and exceedingly irritating and profuse, producing more or less excoriation of the posterior commissure and fourchette. The inflammation generally spreads over the whole mucous lining of the vagina, extending in rare cases to the interior of the uterus; and cases are reported in which it has been known to spread along the Fallopian tubes to the ovaries.

The earliest symptoms attracting the patient's attention are a sensation of heat and pruritus, with frequent desire to pass water. Examination with the speculum shows that the mucous membrane is reddened and tumefied, and the nymphæ may become so much swollen as to protrude beyond the labia. The parts are rendered intensely painful upon motion or pressure. Excoriated patches, occasioned by the discharge, are also the seat of a burning, scalding pain as the urine comes in contact with them during micturition.

Diagnosis.—The diagnosis of gonorrhœa in women is often attended with much difficulty, as leucorrhœa may simulate it in almost

every particular. The discharge of the latter complaint is often, at first, mucous, then thick and purulent, and finally yellowish or greenish; the same changes are observed in gonorrhœa, though the former disease is seldom accompanied by ardor urinæ. In gonorrhœa there is high inflammatory action present in and about the external parts, which, as a general rule, is absent in leucorrhœa, and is much less diffused. The glands of the groin, which often become affected in gonorrhœa, are seldom inflamed in leucorrhœa. The *contagious* character of the former is in no wise to be relied upon, as it may arise from other discharges, as we have already seen. The uncertainty of the diagnosis should, therefore, be kept in mind by the surgeon while expressing an opinion in cases involving domestic happiness, or which become important in a medico-legal point of view.

Treatment.—The treatment of gonorrhœa in the female must vary, according as the disease is acute or chronic. “The same circumstances,” says Yeldham, “which render the disease in women less painful and complicated than in men, render it also much more amenable to treatment.” In the acute stage, when the inflammation is high, *aconite* and *mercurius* become valuable agents in subduing the disease. After the symptoms become mitigated by the use of the foregoing, *cantharis* and *cannabis* may be resorted to with most excellent results. The indications for the preceding medicines are thus arranged:

Aconite—When heat and swelling of the external parts take place, with irritation of the bladder and frequent desire to pass water.

Mercurius corrosivus—After the more urgent symptoms have been mitigated by aconite, and there still remains a milky or yellowish discharge, with considerable heat and itching in the parts.

Cantharis—If there is a frequent desire to urinate, with pain during the act, the discharge being slightly tinged with red; or when, these symptoms being absent, there is burning heat of the external parts, with or without discharge.

Cannabis—When there is cutting and heat between the labia during micturition, and a partial closure of the urethral orifice, with a small quantity of mucus; violent sexual desire, with swelling of the vagina. The discharge causes a smarting of the parts which it touches.

The other remedies mentioned under the head of Gonorrhœa in males may be consulted in this affection when occurring in the female, and may be employed as before recommended, and according to their respective indications—always recollecting that, in the treatment of gonorrhœa in women, specifics are of no use unless the urethra be affected, when they may be used as in the male. As the disease subsides and the inflammatory stage decreases, local remedies are more to be relied upon; and in sub-acute cases, even from the very beginning, these agents are alone sufficient to effect a cure. The injections most usually employed are a weak solution of the *acetate of lead*, *nitrate of silver*, *sulphate of zinc*, *acetate of zinc*, *hydrastis* or *tannin* may be used with decided advantage. These injections may be employed three or four times a day and in large quantity. As a general rule, injections of greater strength may be used for women than for men. From one to two drams of either of these salts, and the same quantity of *hydrastis** or *tannin* to the pint of water, is the average strength employed; but in all cases the quantity must be proportioned to the effect produced and the sensibility of the parts. While using the injection, the patient should lie on her back, with the pelvis elevated; if she take it either standing or stooping down, the injection escapes as fast as it is thrown in, and fails to reach the deeper portions of the canal. Whenever severe or long-continued pain is induced, the strength of the solution should be immediately diminished, and increased again as soon as the tenderness becomes less. When the acute symptoms have subsided, Bumstead recommends dissolving one dram of alum in a pint of flaxseed tea, and inject warm, lowering the temperature gradually until it is used quite cold. Bathing the vagina with cold water alone, in the chronic stage, is of great efficacy, as it tends to keep the parts clean and to give tonicity to the contiguous tissues. After employing injections, it is highly recommended that a piece of lint, saturated with the lotion, should be introduced between the apposed mucous surfaces, so as to prevent their coming into apposition, the discharge being in a great measure kept up by their friction against one another. When the discharges become offensive, Labarraque's solution of chlorinated soda, or carbolic acid, diluted with eight or twelve parts of water, will be found

* The powdered root should be used with the water at a boiling heat.

of great value in correcting the fetor. Plugs of various materials, and moistened with different preparations, have been recommended by surgeons, in obstinate cases, for the purpose of preventing the walls of the vagina from coming into contact.

In such cases, Demarquay highly extols *the plug*, saturated with a solution of one part of *tannin** to four parts of *glycerine*. His plan of treatment is: first, subdue the inflammatory symptoms by appropriate regimen, baths, and frequent emollient injections; next, as soon as a speculum can be introduced, inject simple water in large quantities, in order to remove all secretions from the vaginal walls; then *dry* them by the use of swabs; and lastly, distend the cavity with plugs of charpie saturated with the tannin and glycerine mixture. The next day the patient should take a bath, the plugs be removed, the injection repeated, and fresh plugs introduced as before. He asserts that the most severe cases are cured with four or five applications thus employed. After discontinuing these, he recommends an injection of the infusion of walnut-leaves, in which one dram of alum has been dissolved, to be used two or three times a day for a week, or longer, if necessary.

Simpson, of Edinburgh, has proposed a substitute for this process of Demarquay. He makes a pessary of the preparation desired to be employed, and, introducing it within the vagina, keeps it in constant contact with the walls of the canal. The formulæ in most frequent use for accomplishing this purpose are as follows:

℞.—Acidi tannici, ℥ij;
Cerae albæ, ʒv;
Axungiae, ʒvi.
Mix, and divide in four pessaries.

℞.—Aluminis, ʒj;
Pulv. catechu, ʒj;
Cerae flavæ, ʒj;
Axungiae, ʒvss.
Mix, and divide in four pessaries.

Hip-baths, taken every morning on rising, are valuable auxiliaries in the treatment of this affection, either in the acute or chronic period. The temperature of the water should be regulated according to the feelings of the patient, her accustomed habits, and the

* It will be recollected that preparations of tannin stain the linen, and therefore its use should be carefully guarded.

strength of constitution. In those unaccustomed to daily bathing, the bath should at first be lukewarm, and the temperature gradually lowered from day to day as the system becomes accustomed to the change. They should never be used so cold, nor continued so long, that the patient is chilled for some time after their employment. The tonicity of these baths may be augmented by throwing in a handful of rock-salt to each bucket of water used, and reaction may be promoted by friction with a coarse towel, flesh-brush, or hair-mitten.

Hygienic measures are of great benefit throughout the course of this disease. During the inflammatory period, the patient should abstain from highly-seasoned dishes, meats, rich soups, pastry, cheese, strong tea and coffee; and in lieu of these, she should partake of plain, unstimulating food, such as bread, rice, eggs, vegetables, simple puddings, etc. All violent and prolonged exercise, and especially sexual excitement, should be *positively prohibited*, and even standing for any length of time interdicted. As the acute stage subsides, the patient's diet may be more generous, and greater freedom of motion permitted; but in no case *should sexual congress be indulged in until at least ten days after all evidence of the disease has passed away.*

SECTION IV.

CHANCROID.

Definition.—By “chancroid” is meant a contagious ulcer of the genitals, unattended by contamination of the general system.

Synonyms.—Owing to the confusion which for many years existed in the attempts to distinguish clearly between the two varieties of venereal ulcer, several different terms were employed by authors to designate this variety, such as “simple,” “soft,” “non-infecting,” and “non-indurated” chancre; while it is called “chancrelle” by Diday, and by others distinguished simply as “chancre.”

History.—Ulcers of the genital organs, attended by suppurating buboes, have been described by various Greek, Latin, and Arabian authors from the earliest ages. Hippocrates, who wrote in 460 B.C., speaks of the disease, giving many details of treatment. Celsus, also, who was cotemporary with Horace, Virgil, and Ovid,

gives a most faithful description of the simple, phagedenic, serpiginous, and gangrenous venereal ulcers, as they are seen to exist even at the present time. In short, all the older writers on medicine have described simple venereal ulcers; and hence they are known to have been prevalent from the earliest times of which we have any record. No history, however, of venereal diseases, written previous to the fifteenth century, makes the least allusion to a variety of ulcer accompanied by constitutional symptoms, and which were hereditary in their character. * It is hence safe to conclude that the ulcer known to the ancients was only a canchroid affection, and that syphilis proper, as appears from its history, was wholly unknown prior to about the close of the fifteenth century.

Chaneroid and Syphilis Distinct.—From the most reliable historical data that can be gathered, it appears that syphilis first attracted the attention of the medical profession in 1494, during the siege of Naples, at which time and for nearly thirty years succeeding it was described by Marcellus Cumanus, Alexander Benedictus, Gaspard Forella, John de Vigo, and others, as a disease entirely distinct from the variety characterized by simple venereal ulcer unattended by infection of the general system. Owing, however, to the various points of resemblance sustained by the two affections, together with their identity in the mode of transmission, they were at length attributed, by George Vella (1508), to one and the same cause, the various modifications observed being referred to peculiarities of temperament, constitution, hygienic influences, coexisting diseases, etc. Hence, in the course of time the characteristics of the old and the new ulcer became so blended as to destroy all distinction. The frequent observance of the fact, however, that certain venereal ulcers are confined in their action to the part upon which they were situated and its immediate vicinity, whereas others are invariably followed by infection of the general system, led several able writers to doubt the identity of the causes producing so widely different effects; and hence a belief was expressed in favor of the plurality of the poisons. Still the important question was not settled by a successful attack on the doctrine of idiosyncrasies, temperaments, and other influences, until the year 1852. At

* The hereditary character of syphilis was first mentioned by Gaspard Forella (1498),

this time, M. Baassereau, * a former pupil of Ricord, succeeded in adducing a line of argument, based upon actual observation, that has established the duality of the chancrous virus, and enabled him to enunciate the following law: "Whenever a person has a chancre and afterward general syphilis, the generalization of the disease is first of all due to the fact that the person from whom the contagion came had a chancre which was necessarily followed by general symptoms." This law has since received further confronting testimony, furnished by the investigations of MM. Drou and Clerc, Diday, Bollet, Rollet, Fournier, Ricord, and others. Without, however, entering into the particulars of the clinical experience justifying their conclusions, it will be sufficiently practical to give the result of their observations, as arranged by Bumstead:

"1. Among persons free from syphilitic taint, each of the two species of ulcer is transmitted in its kind—the chancroid as a chancroid, limited in its action to the neighborhood of its site; the chancre as a chancre, followed by general manifestations.

"2. A sore with a soft base, and unaccompanied by induration of the neighboring lymphatic ganglia, in a subject already infected with syphilis, will, when communicated to a person free from syphilitic taint, give rise either to a chancroid or to a chancre, according to the nature of the virus which occasioned the first-mentioned ulcer.

"3. The virus of a chancroid is a poison distinct from that of a chancre.

"4. Phagedenic ulceration of a venereal ulcer does not depend upon a specific difference in the virus."

It being fully established, then, that these diseases are essentially distinct, it is of the first importance that all confusion should be avoided by confining the term *syphilis* to that form of disease in which the ulcer is attended by constitutional symptoms, employing *chancroid* to designate that variety which is entirely *local* in its manifestation. The terms "simple," "soft," "hard," "infecting," and "non-infecting" chancre, may therefore be entirely dispensed with, using "chancre" to designate a *syphilitic* ulcer, "chancroid" a *local* venereal ulcer.

Peculiarities of Chancroid.—The poison of chancroid has no period

* The convincing argument of this author is to be found in his work entitled *Traité des Affections de la Peau, Symptomatiques de la Syphilis*.

of incubation, but commences immediately to develop itself upon being brought in contact with the raw surface. In some instances, however, it may not be observed for several days after exposure, owing to the surface being unabraded, in which case the poisonous matter does not readily reach the circulation of the part. The secretion of the resulting ulcer is highly contagious, retaining its specific character for a considerable length of time; thus Ricord states that he has succeeded in preserving it for seventeen days, while Sperino relates an instance in which inoculation occurred from a puncture with an instrument moistened in the virus seven months before. Dilution in from six to ten times its amount of water does not affect its potency; neither does mixture with vaccine, gonorrhoea or syphilitic matter, impair its power.

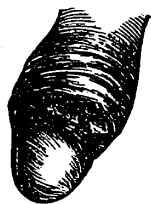
It is most frequently seated on or in the vicinity of the genital organs, though it may occur upon any part of the body, with the exception of the head and face, where it is rarely if ever found.

Its frequency as compared with chancre is seen in the statement made by M. Puche, who prepared a table showing that out of ten thousand cases of venereal ulcers, eight thousand and forty-five were chancreoids, the remainder chancres. This greater frequency is also noted by other surgeons, and is accounted for on the ground that it affords a more copious secretion than chancre, and that one attack affords no immunity from succeeding ones, which is not the case in syphilis.

Symptoms.—When the poisonous matter of the ulcer is implanted on an abraded surface, an open sore is developed from the first; if, however, the virus find its way to the internal surface of a follicle, or in a cut which becomes closed, it first appears as a pustule or small abscess. The second or third day a reddish areola forms about its base, and on the third or fourth day the skin is raised by an effusion of serum, which soon becomes admixed with pus. The pustule remaining unbroken, the matter forms into a conical scab, which, upon removal, leaves an ulcer presenting the following peculiarities: Its edges are abrupt, irregular, and often slightly undermined (Fig. 159, on opposite page); its surface is of a grayish color, and uneven. It penetrates the skin or mucous membrane, according as it is seated on one or the other, making its floor in the subjacent cellular tissue. It has a marked tendency to extend, or, if it remain stationary, does not show any signs of healing at

least for some weeks, and perhaps months. There is a copious secretion of purulent matter, the ulcer readily taking on phagedenic action. It is most rapid in its progress in the tissues which are lax, the outline being circular unless modified by the peculiar shape of the parts. The surrounding areola varies in extent and color according to the degree of inflammatory action which is present. There is, however, little or no change in the normal condition of the tissues immediately surrounding the ulcer, as regards their softness and suppleness—an important fact to note in diagnosis.

Fig. 159.



Chancroid seated around the Corona Glandis.

During the latter part of the fourth week, or in the fifth, the progress of the ulcer becomes arrested; and provided the patient observe cleanliness and moderation in diet, the œdema and surrounding redness will disappear, granulations will form, and a spontaneous cure result. It is, however, important to note that, if fresh matter be applied either during the progressive or the reparative stage, a new contagion will be produced, running the same course as the former ulcer. The neighboring lymphatic ganglia are, in the great majority of cases, wholly unaffected, though occasionally these bodies take on inflammation through sympathy or by an absorption of the chancroidal virus, in which latter case suppuration is inevitable. In syphilitic ulcer, it is to be observed that the nearest lymphatic ganglia are always implicated.

Diagnosis.—Chancroid may be confounded with simple *abrasion*, *herpes*, or *eczema*, but more frequently with chancre.

An *abrasion* due to violence will usually be recognized by the patient at the time of its occurrence; its edges will also be jagged, and will generally heal very readily unless there be a low and diseased condition of the system, or a poison introduced by some abnormal secretion coming in contact with the raw surface. The diagnosis in such cases should be guarded, as it is impossible to say whether or not inoculation has occurred until the case becomes more fully developed.

Herpes usually occurs as soon as the first or second day after the exposure, the vesicles arranging themselves in groups, each group assuming the form of a circle. The fluid contained in the vesicles soon becomes turbid, superficial ulceration succeeding; speedy cicatrization follows, however, which, together with their circular

form, small size, watery secretion, and superficial character, is sufficient to show that the affection is not chancroid. Herpes frequently attacks men, and especially those who have a long prepuce, notwithstanding the women with whom they have had sexual intercourse be entirely free from disease.

In *eczema*, the vesicles are small and diffused, attended with more or less local irritation, the parts being swollen, hot, red, and have an itching sensation. Upon rupture of these vesicles, a thin, watery fluid escapes, followed by the formation of delicate scales. Subsequently, however, the secretion may become acrid, sero-purulent, sanious, or ichorous. But a close examination of the parts and a history of the case, together with the presence of the eruption in other parts of the body, will enable the surgeon to arrive at a correct diagnosis as regards this affection.

Respecting the diagnosis of chancroid as compared with chancre, it may best be studied by reference to the following synoptic table, derived principally from the works of M. Ricord:

Differential Diagnosis of Chancroid and Chancre.

CHANCROID.

Origin.

1. Is always derived from a chancroid or virulent bubo.
2. Has no period of incubation.
3. Develops rapidly.
4. Never occurs upon the cephalic region.

Anatomical Characters.

5. Generally multiple from the first, or soon becomes so by successive inoculation.
6. Surface flat, but irregular; floor fretted or "worm-eaten," and covered by a grayish secretion.
7. Edges neatly cut, and perpendicular, as if cut with a punch, though sometimes undermined.
8. No induration of the sides or base, unless previously cauterized; engorgement temporary and not well defined.

CHANCRE.

Origin.

1. Is always produced by chancre or syphilitic lesion.
2. Has a period of incubation.
3. Develops slowly.
4. Every part of the body liable to invasion.

Anatomical Characters.

5. Generally solitary; multiple from the first, if at all.
6. Surface smooth, or slightly hollowed out; sometimes grayish at the center; floor lardaceous.
7. Edges sloping, hard, often elevated, and closely adherent to the surrounding tissues.
8. Induration firm, circumscribed, and movable, resembling a layer of parchment. Usually continues for a long time.

Pathological Characters.

9. Suppuration profuse and purulent; in the highest degree contagious during the existence of the sore, and anti-inoculable.

10. Heals slowly, with a tendency to invade the surrounding structures, often taking on severe phagedenic action.

11. One attack affords no protection against a succeeding one.

Glandular Affection.

12. Ganglionic reaction generally absent; when present, however, it manifests a disposition to suppurate, the pus usually being inoculable. In the majority of cases, one gland only is implicated.

Prognosis.

13. Is always a local affection, not in the least implicating the general system, and is readily subdued by local applications.

Pathological Characters.

9. Suppuration scanty, chiefly serous or sanious; not readily, if at all, inoculable upon the patient himself or any person under the syphilitic diathesis.

10. Heals quite readily, its limits being soon defined, with little tendency to become phagedenic.

11. Is rarely if ever met with the second time in the same person.

Glandular Affection.

12. The inguinal ganglia on one or both sides are invariably affected. They are painless, distinct, and movable; rarely suppurate; or if so, the pus is never inoculable.

Prognosis.

13. A constitutional affection, exhibiting secondary symptoms in from six weeks to three months, which are often very persistent.

Treatment.—Chancroid, in the absence of all treatment other than cleanliness, when uncomplicated with phagedena, is self-limited in most cases, and heals spontaneously, under ordinary circumstances, in a period of from six to eight weeks. By proper treatment, however, its duration can be materially diminished and the danger of consecutive bubo prevented.

The internal use of mercury, so potent in the cure of *chancre*, produces no good results in this disease; on the contrary, chancroid persists and even progresses more stubbornly in proportion to the extent of the mercurial impression upon the system. Mr. Bumstead says that this is not a mere inference, but is founded upon experience; and relates the following as the result of his observation: "I ceased to employ mercury for 'soft chancres' several years before the distinction between the two species was recognized. Since abandoning it in my own practice, I have had numerous opportunities of observing other surgeons administer mercurials for the chancroid, and my former opinion has only been confirmed. A

few years since, during three weeks' absence from the city, I committed five patients with chancroid to the care of a medical friend, and on my return found them all salivated, and in every one the *sore was aggravated*."

In most cases little or no internal treatment is required in chancroid. If fever coexists, *aconite* may be beneficially employed. *Nux vomica* is useful for digestive derangements, and to oppose constipation; *arsenicum*, when the chancroid takes on a phagedenic character; *lachesis*, when it assumes a gangrenous aspect; *iodine*, when the patient is scrofulous, etc., etc.; and *kali bichrom*, in emaciation, the patient feeling worse in the morning: taking care to select the remedy in each case most appropriate to the derangements as they occur. When, in spite of the remedies employed, the disease persists in its course, *nitric acid* will be found competent not only to stay its march, but actually to cure the ulcerated surface. I have seen a dozen cases that withstood the various local applications employed to cause cicatrization of the chancroid, readily yield to the internal use of this remedy, the same topical means being continued as before.

The local treatment consists in eradicating the chancroid by the application of a powerful caustic which will not only destroy the parts immediately in contact with the virus, but also the tissues beyond the sphere of its specific influence. This may be effected in the early period of its existence by the use of the *nitrate of silver*; but in the later periods, stronger and more potent cauteries are required.

The destructive method, if applied sufficiently early, prevents the formation of bubo by "removing the source from which the virus enters the lymphatics; but if deferred until a bubo has commenced, the latter goes on to suppuration unchecked, and may furnish inoculable pus in the same manner as if the chancroid had been allowed to remain." *

Nitrate of silver may be beneficially employed in the beginning of a chancroid, or in wounds and abrasions following close after a suspicious *coit*, and before the contiguous tissues have become infiltrated with the virus. It should be used in a pointed form, whittled to a size corresponding with the excavation of the ulcer, and pressed

* Bumstead on Venereal Diseases—Chancroid.

into it, permitting it to remain in contact with the tissues for at least half a minute before it is withdrawn. After the chancroid has become more fully matured, a stronger caustic is required. Among the most effectual of these are: the *nitric* or *sulphuric acids*, *potassa cum calce*, the *pernitrate of mercury*, and the *chloride of zinc*.

Nitric acid.—This escharotic should be employed either by the means of a glass rod with a pointed extremity, or the ordinary "drop-glass" used by jewelers to detect impurities in gold, with a tapering glass-stopper extending to the bottom of the bottle. Care should be taken that the acid does not come in contact with the sound tissues; and to prevent this it is advised that they be protected by the interposition of dry lint. The pain for an instant is exceedingly severe, but becomes less acute on subsequent applications, of which there should be several, and continued, indeed, until the destruction of the ulcer is complete. The nitric acid is more penetrating than the nitrate of silver, and should be used in all those chancroids that are fully developed, or when the nitrate of silver has failed to effect a beneficial result. "The same sore," says Bumstead, "which continues to extend under the application of nitrate of silver, will speedily cicatrize under the use of nitric acid, repeated, if necessary, every second or third day." Ricord limits the use of escharotics to every stage of the ulcer except the reparative.

The other caustics named have been much used by surgeons, but in my opinion they possess no virtues superior to the nitric acid. They may be employed in those cases where the nitric acid seems to possess little or no benefit, but I am sure such will be found exceedingly rare.

Chromic acid has of late come into considerable repute in the treatment of chancroid, and is said to possess highly-curative powers in this disease. Dr. T. G. Comstock, of St. Louis, says he has cured in thirty hours several very intractable ulcers of this class, that resisted the best-directed efforts; he succeeded perfectly not only in thwarting the spread of the ulcer, but in changing its phagedenic and ill-conditioned character to that of a healthy, granulating surface. It certainly deserves an extended trial at the hands of the profession, vouched for as it is by the authority above mentioned.

Ricord has of late employed a paste composed of *vegetable carbon*, mixed with strong *sulphuric acid*, of which he speaks in the highest praise.

The French surgeons, especially of the Lyons school, use a paste made of equal parts of *chloride of zinc* and *flour*, first brought before the notice of the profession by Messrs. Rollet and Diday. It is made in the following manner: "The finely-powdered chloride should be intimately mixed with an equal quantity of flour, which has also been dried by heat, and alcohol added drop by drop until a paste is formed, which is to be spread in a thin layer upon cloth, and again subjected to gentle heat. Should deliquescence take place subsequently, the paste may readily be dried again without losing its caustic power. A disk, corresponding in shape to the chancroid and slightly exceeding it in size, is cut out and retained upon the surface, previously cleansed of matter, from one to three hours; and in large or phagedenic ulcers, for five or six hours. Two hours is the average duration required for ordinary cases. The patient should keep his bed until the paste is removed; and since only one surface of the plaster is covered with caustic, the prepuce may be drawn forward, when the sore is situated upon its internal surface or upon the glans, without danger of injury to the sound tissues."

As dressings applied to the ulcer after the destruction of the virus by escharotics, and to assist in the granulating process, the following are among the most valuable:

℞.—Hydrastis, pulv., ℥i;
Aqua bull., ℥ijj. M.

℞.—Phytolacca dec., ℥j;
Aqua, ℥ijj. M.

℞.—Calomel, ℥i to ij;
Aqua calcis, ℥iv. M.

℞.—Acid carbolic, gr. viij;
Aqua pura, ℥j. M.

℞.—Acid nitric dil., ℥i;
Aqua pura, ℥viij. M.

℞.—Liquor soda chlor., ℥j;
Aqua pura, ℥ij. M.

℞.—Potassio-tart. ferri, ℥ij to viij;
Aqua, ℥viij. M.

℞.—Bichlorid. hydrargyri, gr. ij;
Aqua calcis, ℥ij. M.

℞.—Calendula, ℥j;
Aqua, ℥ijj. M.

Lotions are valuable when the ulcer is situated upon the external parts, in order to keep its surface moist and prevent the dressings from adhering to the sore.

Lotions of *acetate of lead*, in such common use, are less serviceable than the preceding, owing to the chemical change that takes place when the lead is brought in contact with the animal secretions, forming an insoluble albuminate of lead, which, being deposited upon and forming incrustations with the discharges from the sore, makes it exceedingly difficult to remove, and therefore militates against cleanliness, so much to be insisted upon in the treatment of this affection.

Unguents are objectionable on this account, and should only be employed in those cases where it is impracticable, from various causes, to use the preceding. Among the best of these dressings, and which are recommended when compelled to employ unguents, are the following formulæ employed in the French hospitals :

R.—Cerate simplex, ℥j;
Tinc. opii, ℥j;
Calomelanos, gr. xxvi. M.

R.—Ungt. zinci ox., ℥j;
Pulv. opii, ℥j. M.

R.—Balsam Peruviani, ℥j;
Oleum ricini, ℥j. M.

R.—Hydrastis can. pulv.; ℥j;
Cerate simplex, ℥ij. M.

The frequency with which local applications are to be renewed depends upon the quantity of the secretions, it being desirable to keep the parts clean and avoid the pernicious result of permitting them to collect and desiccate around the contiguous structures. The dressings should therefore be renewed, if the ulcer be a simple one, two or three times a day; but if it assumes a phagedenic character, a much more frequent application is required. If the granulations become too exuberant during the stage of cicatrization, they may be slightly touched with the *porte-caustic*, as recommended under the head of *Ulcers*.

COMPLICATIONS OF CHANCROID.

Chancroid may become complicated with *excessive inflammation*, with *phagedena*, or with *syphilis*.

1. The complication occasioned by high inflammatory action may become so serious as to terminate in gangrene, and consequent sloughing of the surrounding tissues. There are a variety of causes which may give rise to this condition, such as mechanical violence, application of powerful caustics, want of cleanliness, and the incor-

dinate use of stimulants. The more common causes, however, are phymosis and paraphymosis.

Symptoms.—The extremity of the penis becomes red, swollen, and œdematous; a dark, gangrenous spot soon appears, involving the surrounding tissues and prepuce to a greater or less extent; the original sore becomes entirely superseded by the more destructive inflammatory action which is set up, the transformed ulcer extending beyond the limits of the specific influence of the chancroidal virus. After the detachment of the eschar, the subsequent secretion of the ulcer is wholly innocuous.

Phagedenic Chancroids are characterized by their rapid and extensive destruction of the parts involved, together with their irregular form; whereas the ordinary chancroidal ulcer is slow and limited in its progress, maintaining a circular form, and not implicating the tissues to any great depth.

There are several varieties of phagedena—the *mild*, the *serpiginous*, and the *sloughing*.

The *mild* form, which is the more common, presents no very marked peculiarities, other than its tendency to erosion and steady increase beyond the ordinary limits of chancroidal ulcer.

In the *serpiginous* variety, the extent of the destructive process and the duration of its action are often most alarming, the ulceration frequently undermining the integuments of the penis even to the pubes; or perhaps extending down the thigh nearly to the knee, or upward on the abdomen, following in the line of the crest of the ilium. The parts implicated become of a dusky, livid hue, and œdematous, often perforated at various points, and exceedingly irregular. The secretion is thick, and of a grayish color, while the succeeding granulations are florid and protruding, bleeding profusely upon the slightest touch. Provided, however, ulceration supervenes subsequent to cicatrization, the newly-formed tissue becomes rapidly destroyed, with the appearance of a thin and sanious secretion which preserves its contagious character during the existence of the ulcer. This variety may be distinguished from the ulceration of tertiary syphilis by its origin being referred to chancroid, and the character of its secretion; which latter has no tendency to form scabs, and manifests contagious properties by inoculation.

The *sloughing* variety is rapid and highly destructive in its character, none of the tissues being able to resist its progress. The

constitutional symptoms are often very marked, there being a rapid increase in the circulation, with fever, headache, and intense local pain. There is a foul, copious secretion infiltrating the surrounding parts, while the ulceration may implicate the arteria dorsalis penis, producing profuse if not fatal hemorrhage. It is most likely to occur in the lower classes of patients, as in the inmates of cellars, almshouses, and other ill-ventilated places, and is sometimes accompanied by buboes.

Treatment.—The treatment of chancroid is based upon a knowledge of the causes operating in the system, and which produce the destructive action. "It is," says Yeldham, "less a separate form of chancre than a condition supervening upon other chancres during their course." It occurs among persons in bad health from intemperance, irregularities in living, or in those constitutions tainted with mercurial impressions either previous to or during the infection. The disease is exceedingly obstinate, and sometimes resists all our best-directed efforts to stay its progress.

Among the internal remedies, none are more prolific of good results than *arsenicum* and *lachesis*; and frequently, by the use of one or both of these remedies, the phagedena will almost immediately subside and the case go on to a rapid recovery without the use of any other internal remedy. If the phagedena depend upon a mercurial poison affecting the system, *nitric acid* will be productive of great benefit by antidoting the poisonous effects of that drug. Ricord recommends for this affection the *potassio-tartrate of iron*, styling it the "born enemy" of phagedena, and attributes to it an almost specific influence upon ulcerative action. He recommends its use in accordance with the following formula:

R.—Ferri et potassæ tart., ℥ss;
Aquæ, ℥iij;
Syrupi, ℥iij;

Of which two teaspoonsfuls of the remedy may be taken three times a day. It is, in my opinion, however, decidedly inferior to the remedies above mentioned.

A solution of the *permanganate of potassa*, which has been employed at the New York Hospital with great success, is highly spoken of as a local application to sloughing phagedenic ulcers. "It was used," says Bumstead, "as a saturated solution (gr. lxxv,

ad. aquæ 1 oz.), applied every two hours, and the sores dressed between the applications with lint soaked in a mixture containing a dram of the saturated solution to a pint of water, until the surface of the ulcers cleared off, when the dressing was alone continued. The pain of the application was not severe, and in each instance reparative action was set up in the course of from twenty-four to forty-eight hours."

"The chief means for the cure of phagedenic chancroids, in allopathic practice," says Bumstead, is "to destroy them by powerful caustics; the escharotics being correspondingly more powerful as the phagedena is more virulent." Ricord extols the use of the *fuming nitric acid*, in severe cases, twice a day, and less frequently in the milder forms, being careful to touch every elevation and crevice of the chancroid; in the meantime the ulcer is to be dressed by the aromatic-wine dressing, or a solution of the potassio-tartrate of iron.

Roberts recommends the use of the *carbo-sulphuric* paste (previously spoken of), applied to the chancroid; and Bumstead urges "a trial of the local application of *bromine*, which has recently proved so successful in the treatment of hospital gangrene."

Chlorate of potash is strongly recommended by Dr. E. Tillot: he relates six cases of phagedenic chancroid in which the chlorate was successfully employed. "The effects of the treatment were manifest," he says, "at the beginning of the application. Its first effect is to relieve pain wherever it exists, to diminish the intensity of the suppuration, and to modify the characteristics of the morbid surface by changing its action; and, above all, its power is undoubted in arresting the phagedenic character of the disease."

Carbolic acid.—This agent has of late come into considerable repute as an application for ulcerated surfaces and morbid growths, and has been highly spoken of as a local remedy in the various forms of chancre and chancroid. In the treatment of *phagedena*, the author has not seen any reliable evidence of its curative action; but as an external application in chancre, it possesses undoubted efficacy. It is most frequently used in the *first* dilution; but if necessary, the *pure* acid may be employed.

"In spite of all that can be done," says Yeldham, "to arrest its progress, it will sometimes continue to spread until large portions of the genital tissues are disorganized."

I have often succeeded in curing these phagedenic chancroids by a saturated solution of *arsenicum* (3), or *lachesis* (6), continually applied to the sore, even when they have for days withstood the caustic applications of the old school. In other cases, however, they seemed to possess little or no curative action, although at the same time administered internally. A return, however, to the use of one of the preparations of *mercury*, the *nitric acid*, or *stillingia*, as indicated, produced the most satisfactory results. It is in such obstinate and persistent chancroids that *all* the resources of the surgeon's art are imperatively demanded.

Mercurius sol.—Of all the preparations of mercury, in the phagedenic chancroid, there are none that I have found to produce such beneficial results; and when the remedy is at all admissible in this variety of chancroid, I believe it to be so in consequence of either a pre-existing attack of syphilis or a syphilitic complication with the phagedena. In such cases, this remedy should be given in the second or third trituration, and continued at lengthened intervals whenever improvement sets in. If no improvement should take place within the first two or three days, a lower potency must be resorted to, and if necessary even the pure drug may be administered.

Cinnabaris is another remedy of considerable efficacy in the incipient stage of phagedenic chancroid, especially in that species of the ulcer that resembles a condyloma. I have used it with most success in the second trituration, given internally as well as applied locally to the part. It is a remedy that demands of the profession frequent and repeated trials; and its use, I am convinced, will rarely disappoint the practitioner in the earlier stages of the disease.

Nitric acid, *aurum*, *staph.*, *calc.*, *phosph. acid*, and *sulphur*, are indicated when the disease is complicated with psora, scrofula, etc., and are required as intercurrent remedies.

In the *serpiginous* variety, *thuya* is a valuable remedy, as is also *graphites*; and in my hands both have accomplished brilliant results.

Mixed Chancre is a term employed by the French surgeons to express a complication of chancroid with syphilis, it having been confirmed by actual experience that the existence of syphilis offers no protection against the invasion of chancroid, and *vice versa*. And what is quite remarkable, neither affection seems to influence

the progress of the other; and though the virus of each be introduced *at the same point*, the normal course of each will be developed without the least essential change in its characteristics. It has also been further observed that the mixed chancre may be perpetuated in its kind by successive inoculation; cases in point being reported by Fournier, Rollet, and Laroyenne.

The more common manner of producing this variety of ulcer is by the occurrence of sexual intercourse between persons, one having chancre and the other infected with chancroid; though, as already intimated, it may be contracted by a perfectly-sound person having connection with another affected with both chancroid and syphilis.

According to Rollet, as stated by Bumstead, two or three days after the application of the virus of a chancroid to a chancre the sore assumes a grayish aspect, like an ordinary chancroid, but is less excavated; its edges become jagged, and its purulent secretion more copious and sanious; it may give rise to successive chancroids in the neighborhood, or to a virulent bubo. It preserves, however, the essential characters of a chancre, and, among others, induration of its base, which is always pathognomonic; the ganglia of both groins are indurated as usual, unless a virulent bubo supervenes, when those of the opposite side may still indicate the nature of the disease. The general symptoms following the chancre are not modified by this inoculation, and secondary symptoms appear at the same time and in the same manner as under ordinary circumstances. The more copious secretion of the chancroid renders this species more liable to be ingrafted upon a chancre than the latter upon the former. Provided, however, both diseases are contracted by a single connection, the chancroid, having no period of incubation, is first developed, with abrupt edges, grayish floor, and soft base; subsequently, as the chancre appears, the base of the sore and the neighboring lymphatic ganglia become indurated, together with the other symptoms peculiar to syphilis.

Treatment.—In view of the fact that each disease runs its course independent of the other, the treatment to be adopted must necessarily include the local applications adapted to chancroid and the constitutional remedies employed in syphilis.

SECTION V.

BUBO.

The term *bubo* has from time to time been used in a very indefinite sense, being applied to glandular enlargements occurring in any part of the body. It is generally employed, however, to signify *a tumor of the inguinal glands*. The term should be limited still farther, and used to designate *a venereal affection of the lymphatic glands, accompanied by inflammatory symptoms, and exhibiting a tendency to terminate in suppuration*; thus wholly excluding simple "induration of the ganglia," arising from other causes, such as gonorrhœa, excessive sexual indulgence, violent exercise, injury of the inferior extremities, the presence of boils, etc. Swellings due to these causes are particularly apt to occur in young subjects of strumous habits, and require little active treatment, seldom passing on to suppuration. Syphilitic indurations of the ganglia are also comparatively unimportant, never suppurating unless complicated with some additional cause. Suppurating buboes, therefore, in the great majority of cases, are to be regarded as dependent on the influence of chancroid, the ganglia involved being those which are superficial and nearest the ulcer in the course of the lymphatic circulation.

Sympathetic Bubo.—The sympathetic bubo, due to the influence exerted by the presence of gonorrhœa or chancroid, may affect one or more of the ganglia. The symptoms attending consist of a fullness in the groin, with more or less pain, tenderness on pressure, and actual enlargement of the gland. The surrounding cellular tissue becomes somewhat thickened by infiltration, though the gland remains more or less movable under the integument. In this degree of severity, resolution occurs without suppuration. In more serious cases, however, the inflammatory action runs high; the tumor becomes greatly swollen and adherent to the surrounding tissues; there is intense pain and tenderness; the skin becomes reddened, and suppuration rapidly ensues; and unless the abscess be opened freely and early, the pus will be very likely to burrow and travel in various directions, the fistulous tracts being often several inches in length.

Virulent Bubo.—The virulent bubo results from an absorption of the chancroidal virus along the lymphatics to the ganglion, where it becomes arrested, developing a specific inflammation, which inevitably terminates in the formation of inoculable matter. The humor will generally be found to occur on the same side as the chancroid, though exceptions may occasionally be met with, owing to the interlacement of the lymphatic vessels on the dorsum of the penis. This variety of bubo may also take on phagedenic action, which it will be very likely to do, provided the chancroidal ulcer preceding it is thus complicated. In this case there will be severe pain; a thin, profuse, and sanious discharge; and a foul, pultaceous state of the sore, together with an irritable condition of the general system.

Indolent Bubo.—The low type of inflammation is the marked characteristic of indolent or scrofulous bubo. The tumor enlarges very slowly; has a soft, doughy feel, with little pain or tenderness on pressure, and is not seriously aggravated by motion. It soon loses its mobility in consequence of the adhesions which it contracts to the skin and underlying fascia. The suppurative period is indicated by the occurrence of chills and fever, and by observing a sense of fluctuation, the skin in the meantime becoming thin and of a livid red color. The contents of the abscess are of a yellow-greenish hue, being thin, watery, and flaky, and never presenting the appearance of ordinary healthy pus. Fistulous canals may form, running in various directions; gangrene or phagedena may supervene in rare cases, attended by more or less constitutional disturbance.

Treatment.—The objects to be attained in the treatment of buboes are: 1st, to prevent, if possible, the growth; and 2d, having failed in this, to hasten the cicatrization of the ensuing abscess. The opinion formerly held, that the "repulse of matter" was necessarily attended with danger, is now known to have been entirely erroneous and without foundation.

General treatment is not required in this complication save when the system is deranged by the invasion of the bubo. If fever supervene, *aconite* should be administered, to be followed by *mercurius*, or not, as the symptoms demand. Local applications, however, are to be relied on even from the very first. In the treatment of bubo, rest, especially upon the back, should be enjoined by the surgeon. If the patient is seen at an early period, and before the second stage of inflammation has set in, ice continuously applied to

the bubo will most always discuss it. Another application of value is a diluted *tincture of iodine* applied to the part two or three times a day, and continued until a complete discussion of the tumor has taken place. Mr. Henry Thompson highly recommends a "solution of three drams of the *nitrate of silver* to the ounce of water, with the addition of twenty minims of strong *nitric acid*. This, he says, "should be freely applied to the whole surface of the tumor, and be repeated as soon as the eschar falls off; or the solid stick of nitrate may be employed, by first moistening the surface with water and then applying the crayon for a few minutes to the part. A *cantharides* blister, or *chloroform* applied to the tumor by saturating a compress with it and applying to the part until the surface is vesicated, has frequently succeeded in repulsing the formation of bubo when other agents were impotent to check it. When these means have failed, however, and inflammation goes on to the formation of pus, the abscess should be promptly opened by a free incision, taking the precaution of having the part shaved before the incision is made. After draining the abscess of all its contents, a warm flaxseed-poultice should be applied morning and evening for two days, for the twofold purpose of relaxing the tissues and exhausting the bubo of contained discharges; then throw in a weak solution of *tinc. iodine*, and wash it well out. When the abscess is quite empty, a large compress of lint, saturated with *calendula* or *hydrastis* lotion, should be placed over it and retained *in situ* by firm pressure. If the patient can be kept quiet for twenty-four or thirty-six hours, the walls of the sinus will become partially agglutinated, and adhesion will sometimes take place without further trouble.

Roux and Marchal have proposed to inject the abscess, immediately after opening it, with a mixture of one part of *tinct. iodine* to three or four of water. Langston Parker speaks highly of the following plan. He says: "When a bubo is ready to be opened, we should not suffer the skin to become too thin, but make several very small punctures over its thinnest part with a grooved needle—perhaps six, eight, or ten; through these the matter will ooze out till the cavity of the abscess is empty. Through one of these punctures the point of a very small glass syringe may be introduced, and a very weak solution of the *sulphate of zinc* injected, in the proportion of two or three grains to the half-pint of water.

When the abscess is quite empty, place over it a large compress of lint, and use moderately-tight pressure by means of a roller. In many instances, if we can keep the patient quiet for twenty-four hours, we get either partial or total adhesion of the sides of the bubo, and a speedy cure will be the result. In other cases this may not terminate so successfully; but by the daily use of the injection through one of the apertures (which should be kept open for that purpose), we succeed in a few days, in almost every case, in effecting a cure." This process, which seems to be so simple and appropriate, I have never put in practice, and therefore can not speak of its efficacy. Simple buboes, when the patient is vigorous and active, get well under the measures heretofore recommended; but in broken-down constitutions, from any cause, they are often very persistent, and tax all our medical ingenuity to cure them. This variety of buboes Bumstead divides into two classes: 1st, *virulent* buboes, which take on phagedena and run a course similar to the phagedenic chancroids, involving the structures considerably beyond the inguinal region, and giving rise to large open ulcers; 2d, *cachexial* or *indolent* buboes, which are maintained by some morbid diathesis, or by constitutional depravity, and are limited to the groin, where they burrow in various directions beneath the tissues, causing extensive ulceration of the integument and surrounding structures.

In the first variety, *lachesis*, *arsenicum*, and *nitric acid*, will be found of great benefit, the case going on to a complete recovery under the use of one or more of these remedies. In the second variety, medicines will have to be given which act beneficially upon the general system and strengthen the vegetative processes; they will be selected according to their indications, and persevered in until curative action sets in. In addition to these, fresh air, nourishing diet, bathing, and a well-directed hygienic treatment, will have to be adopted. As local applications, strong *nitric acid*, the *Vienna paste*, and other powerful escharotics, may be used for the purpose of cauterizing the structures beneath. "Whatever the depressing cause may be," says Bumstead, "it should, if possible, be removed, and the system be brought into a better condition, before benefit can be expected from local treatment." In this connection I can not reprobate too severely the practice employed by some surgeons of giving the mercurial preparations to overcome the diseased action, for in two cases thus treated the most disastrous

results have been witnessed by the author. "Recollect," says Bumstead, "that the presence of a bubo by no means proves that the patient has syphilis, the existence of which should not be admitted until after the most careful and thorough examination. Should the fact be clearly established, specific remedies will sooner or later be required." The different preparations of iron will sometimes prove beneficial in the absence of a syphilitic taint, and the patient should be put under the most favorable hygienic influences. As the patient's health improves, the bubo will be found to assume a more favorable aspect. When the sinuses are not too deep or extensive, they should be laid open and dressed with lint saturated with either *calendula*, *hydrastis*, or *phytolacca* lotions. The lint should be placed on the bottom of the ulcer, which should be filled up with the dressing; or in lieu of this, the walls should be cauterized by the solid stick of *nitrate of silver*, or a strong solution of the same material. Another plan is to inject the sinuses with diluted *tincture of iodine*, every day or two, and apply pressure over the tumor by means of compressed sponge and a roller, or with a well-graduated pad. As the patient's health improves under the use of constitutional remedies, the bubo generally assumes a more favorable aspect, and will readily heal under the influence of the remedies heretofore recommended. The bubo requires the same treatment as the chancroid, and usually disappears at the same time with it.

SECTION VI.

SYPHILIS.

Definition.—Syphilis is a specific venereal disease, transmitted by means of its own peculiar virus coming in direct contact with an abraded or delicate surface; by inoculation through the medium of the secretions; or by hereditary descent.

Its development presents the following order of symptoms: the primary or local, and the constitutional—the latter being subdivided into secondary and tertiary symptoms.

The *primary* symptoms consist essentially in the occurrence of a characteristic sore (chancre) and induration of the lymphatic ganglia.

The *secondary* symptoms include various affections of the skin and mucous membrane; while the *tertiary* symptoms are manifested in the deeper structures of the body, as the fibrous and osseous tissues.

History.—The early history of syphilis has given rise to elaborate and learned discussions, but is still enveloped in much obscurity. Without entering into any line of argument respecting the date of its first appearance, I deem it quite sufficient briefly to present the suppositions most worthy of notice that have been advanced by various authors: *

1. The first supposition receiving most credence at the hands of the most reliable authors refers the date of its origin to the year 1494, during the invasion of Italy by the army of Charles VIII of France, at which time it received the name of “*Mal de Naples*” from the French; while the Italians, being quite as willing to ascribe its origin to their invaders, called it the “*French disease*.”

A large amount of evidence in support of the position that syphilis was wholly unknown prior to this time, is adduced by Van Helmont, Howard, Simpson, Bassereau, and Chabaliér. The evidence, too, seems very conclusive, when we recollect that no clear and definite descriptions of the disease were written previous to this date; whereas, immediately subsequent to the events recorded as occurring during the siege, several authors gave a true picture of syphilis, regarding it as a disease distinct from any that had been before observed. Thus, James Cataneus de Lacu Marcino, in his treatise *de Morbo Gallico*, written in 1505, states that in 1494, during the invasion of Naples, there appeared in Italy a terrible disease, which was never before known in any age; which was new to the whole world; which did not resemble the *asaphati*, or any other serpiginous and fetid ulcer.†

Philip Beroald writes that this “*French disease*” is characterized by enormous, prominent spots; by pustules, giving the face and body a hideous aspect, sometimes painless, at other times causing the most excruciating suffering in the joints, and depriving the patient of rest and sleep at night; slowly consumes the body; that

* For a thorough investigation of this subject, the student is referred to Cooper, Lawrence, Bassereau, Langlebert, Chabaliér, and Rollet.

† Chabaliér, op. cit. p. 87.

it can be cured by no remedy, and that it was unknown to his ancestors.

Jourdan, in a pamphlet entitled *Historical and Critical Observations of Syphilis*, page 4, says that, if by syphilis is meant "a general affection of the system, which presents itself under a most frightful aspect, with many particular modifications, * * * it may be used to designate the disease which broke out toward the close of the fifteenth century."

2. By others, the disease has been supposed to be of American origin, which opinion was strenuously advocated by Oveido, Leonard Schmans, and Van Hutton. The testimony, however, in favor of the supposition of its being generated in consequence of the intercourse of the Spaniards with the Indian women of this continent at the time of its discovery by Columbus, is regarded as far from conclusive.

3. The opinion entertained by Samuel Janson, and subsequently defended by Sydenham and Boerhaave—viz: that it was brought by the slaves from Africa—is met by the significant fact that no slaves were carried to America prior to 1503, at which time the disease was prevailing over all Europe.

4. The supposition defended by many able writers, that syphilis has existed from the earliest ages, is rendered exceedingly doubtful by the fact that the descriptions of venereal affections, as given by Celsus, Galen, and other ancient writers, illy correspond with the characteristics of the highly-contagious and constitutional disease observed in the fifteenth century. That chancroid has existed from the highest antiquity, and is the affection referred to in the Mosaic law, and by the older writers on medicine, scarcely admits of a doubt.

General Characteristics.—The most prominent characteristics of syphilis are the following:

1. Its development is dependent upon the presence of a specific virus, by which the disease is transmitted from one individual to another.
2. It is peculiar to man.
3. It seldom occurs but once in the same person.
4. It possesses a "period of incubation."
5. There is a degree of order and regularity in the development of the symptoms.

Syphilitic Virus.—Syphilis never occurs spontaneously; hence, the existence of a peculiar virus known as the poison of syphilis or chancre, though formerly questioned, is now universally acknowledged. The *nature* of this contagious element is wholly unknown, it possessing neither physical, chemical, nor microscopical characters which distinguish it from the pus supplied by ordinary inflammatory action. Thus, it may be thick and yellowish, serous, ichorous, or plastic; acrid, acid, alkaline, or neutral; pure, or mixed with other matter, without any change in its specific action. Like the virus of small-pox, it is evidently zymotic in its action—the smallest, inconceivable atom being capable, under favorable circumstances, of developing all the local and constitutional symptoms peculiar to this disease. It exhibits little or no predilection for sex, age, temperament, or occupation, and is not in the least prevented by the previous existence of disease. The specific property is retained for several weeks, if the pus be preserved in a well-corked bottle; though it may be rendered innocuous by chemical agents and by gangrene of the parts.

Syphilis Peculiar to Man.—Efforts to inoculate animals successfully have frequently been made, but in no instance have the peculiar symptoms followed that are observed in the human subject. The local inflammation induced in the monkey by introduction of the virus assumes an appearance somewhat resembling a chancre, but no general symptoms have ever been obtained even in this animal.

Seldom Occurs but once in the same Person.—It has long been observed that, owing to a peculiar modifying influence exerted by certain infectious diseases, as small-pox, scarlatina, measles, etc., a degree of immunity is conferred by which future attacks are very much mitigated if not entirely prevented. The “unicity of syphilis,” however, was first announced by Ricord in 1839, and has since been investigated by others, who have furnished additional testimony to the same effect. Diday has met with over twenty cases, from which he arrives at the following conclusions, as quoted by Bumstead:

1. As a general rule, the syphilitic, like other kinds of virus, does not exercise the same action twice in succession upon the same person.

2. When applied (under such conditions as to permit absorption) to a syphilitic subject, this virus produces no effect; applied to a subject who has had, but who no longer has, syphilis, it produces a modified form of syphilis.

3. The more feeble the first attack, and the longer the time that has since elapsed, the more energetic will be the action of the virus and the more severe will be the second attack of syphilis; and *vice versa*.

4. Experience shows that the only persons upon whom a second introduction of the syphilitic virus produces a pathological effect are those who are cured of their first attack, or who at least have no other symptoms than those which can not be transmitted either by generation or by contact. Hence,

5. The possibility of reinfection proves that syphilis can be radically cured—a fact denied by many authors, who admit only a cure of syphilitic manifestations, and who maintain that the constitutional poisoning is perpetual.

Syphilis possesses a Period of Incubation.—The recorded observations of different authors establish beyond question the fact that the introduction of the syphilitic virus is followed by an interval of quiescence previous to the appearance of chancre. The time elapsing, however, is more or less influenced by the structure of the inoculated surface, the natural susceptibility of the part, and the purity of the poison; and hence the variations in the duration of this period.

Diday * reports twenty-nine cases in which the chancres were of recent origin, fourteen days intervening between the time of exposure and the occurrence of the resulting chancre.

M. Chaballier,† in ninety cases, found a period of incubation averaging from fifteen to eighteen days. M. Clerc has examined quite a number of cases in which the appearance of the sore was delayed for thirty days. He especially insists on a period of latency as a reliable diagnostic sign of chancre. Bumstead, also, to whom we are indebted for much valuable information on venereal, states that he has met with very many cases in which the interval between a single exposure and the appearance of a chancre exceeded fourteen

* Gaz. Med. de Lyon Mar. 1, 1858.

† Thèse de Paris, No. 52, 1860, p. 111.

days, and in some cases there is every reason to believe that it has been of much longer duration.*

The Symptoms possess Regularity in their Evolutions.—The evolutions of the symptoms of syphilis, especially those immediately succeeding the period of incubation, observe great order and regularity, being only slightly modified by peculiarities of temperament or external influences, such as diet, occupation, or habits. Hence, it may be predicted with confidence that every patient with chancre will, in the course of three months, be attacked by the following train of symptoms, provided they are not influenced by treatment: A sense of general lassitude, with headache, accompanied by darting pains in various parts of the body; falling off of the hair; an eruption of blotches or papulæ upon the general surface; pustules upon the hairy scalp; glandular enlargement, and whitish patches upon the mucous membrane of the throat, anus, or vulva, which tend to ulceration.

Subsequent, however, to the first appearance of the constitutional symptoms, the manifestations exhibit a degree of variation, in consequence of the intervention of certain symptoms in one case which are wholly wanting in another, while at the same time the more constant lesions peculiar to the syphilitic scale are more subject to modifying influences. Still, there is always a degree of uniformity that will enable the experienced surgeon to arrive at an approximate conclusion respecting the time that has elapsed since the exposure of the patient, and to determine, also, with a high degree of certainty, the character of the symptoms already experienced. The confusion sometimes arising from the apparent exceptions to the regular succession of the general symptoms is due to a variety of causes. Thus, the disease may progress with much greater rapidity in one case than in another; or the symptoms peculiar to one stage of the disease may remain present long after the supervention of the manifestations belonging to the succeeding stage; or certain symptoms, as eruptions upon the skin or mucous membranes, may disappear, and after a limited period return again. But the most frequent cause is due to treatment by which the primary and the secondary symptoms may be subdued, and a long

*Op. cit. p. 405.

interval ensue without further manifestations, when finally the disease becomes active again, exhibiting tertiary lesions.

The date of the appearance of any syphilitic lesion can only be given approximately, in consequence of the influence of the constitution of the patient, his habits, and the treatment to which he has been subjected. The following table, however, prepared by M. Martin, from the most reliable statistics, exhibits the averaged date of the appearance of the more important symptoms:

SYMPTOMS FOLLOWING CHANCRE.	DATE OF USUAL DE- VELOPMENT.	DATE OF EARLIEST DEVELOP- MENT.	DATE OF LATEST DE- VELOPMENT.
Roseola.....	45th day	25th day	12th mo.
Papular eruption.....	65th "	28th "	12th "
Mucous patches.....	70th "	30th "	18th "
Secondary affections of the fauces.....	70th "	50th "	18th "
Vesicular eruption.....	90th "	55th "	6th "
Pustular eruption.....	80th "	45th "	4 years.
Rupia.....	2 years.	7th m'nth	4 "
Iritis.....	6th m'nth	60th day	13th mo.
Syphilitic sarcocele.....	12th "	6th m'nth	34th "
Periostosis.....	6th "	4th "	2 years.
Tubercular eruption.....	3 to 5 yrs	3 years.	20 "
Serpiginous eruption.....	3 to 5 yrs	3 "	20 "
Gummy tumors.....	4 to 6 yrs	4 "	15 "
Onychia.....	4 to 6 yrs	3 "	22 "
True exostosis.....	4 to 6 yrs	2 "	20 "
Ostitis, changes in the bones and cartilages.....	3 to 4 yrs	2 "	41 "
Perforation or destruction of the velum palati	3 to 4 yrs	2 "	20 "

PRIMARY SYPHILIS.

Primary syphilis essentially consists of chancre situated at the point coming in contact with the virus, and induration of the neighboring ganglia. This condition of the parts implicated, which constitutes the earliest manifestations of constitutional infection, is followed by a period of latency, during which the poison gives no evidence of its presence in the system. Subsequently, however, the activity of the virus is exhibited, giving rise to a category of symptoms denominated "secondary," "general," or "constitutional."

§ 1—Chancre.

Chancre is the "initial lesion" of syphilis, separated from constitutional symptoms by a period of incubation.

The **seat** of chancre is far more extensive than that of chancreoid, being occasionally found upon every part of the body, including the face and mouth, in which latter situations chancreoid is rarely, if ever, found. Its most common site, however, in the male, is the glans and prepuce. It is rarely met with in groups of two or more, it being shown from extensive statistics that it is solitary in three cases to one in which it is multiple, which circumstance is explainable by the fact, already stated, that when the system is once infected, the virus is incapable of effecting additional lesions.

The **period of incubation**, according to the most reliable testimony that can be gleaned, varies in duration from two to six weeks, the average time of the occurrence of the chancre after exposure being about ten days. This peculiarity of the affection, in common with other infectious diseases, affords the most conclusive evidence that chancre is not a mere local lesion. The fact is rendered still more apparent when we observe that repeated experiment has shown that the most destructive cauterization of a chancre, at a very early period of its existence, does not in the least interfere with the subsequent appearance of secondary symptoms. During this period the inoculated part remains apparently normal, exhibiting no signs of inflammatory action; still, the fact that cauterization within a few hours after the appearance of the initial lesion, together with the corroborating testimony of experiments with other morbid poisons, shows that the absorption is almost instantaneous.

The **form** of chancre is variable. It appears, however, from a table prepared by M. Bassereau, that the superficial form is by far the most frequent. Thus, out of 170 cases of syphilitic erythema, 146 were superficial erosions; 14 were circumscribed ulcers, with abrupt edges, involving the whole thickness of the skin or mucous membrane; while 10 were circumscribed phagedenic ulcers, with a pultaceous floor, involving the tissues a short distance beyond the skin or mucous membrane. The best examples of this form of chancre are met with on the internal surface of the prepuce, where it is protected from the air and friction and kept free from scabs. In this situation especially it sustains a strong resemblance to simple abrasion, for which it is often mistaken. If exposed to the air it becomes covered with scabs, having the appearance of a pustule of ecthyma, or a patch of scaly eruption.

The **appearance** of chancre is first exhibited in the form of a

papule, which, taking on superficial ulceration, increases in extent, being slightly excavated, and incrustated with a layer of lymph, of a dirty grayish color. The edges of the ulcer are hard, slightly elevated, and incline from within outward. (See Fig. 160.) It has no distinct areola, secretes a thin, serous, sanguinolent, or ichorous matter, which, in respect to quantity, is much less than the secretion of chancroid.

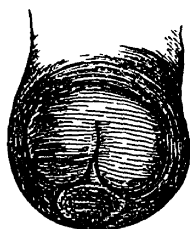
The characteristic induration is entirely distinct, and should be carefully distinguished from the engorgement consequent on a deposit of plastic material produced by common inflammatory action. The induration, as a general rule, begins about the fifth day, usually attaining its maximum by the end of the tenth or twelfth; though cases are reported in which the induration did not occur until after the twentieth day.

It occurs wholly independent of all the characteristic signs of inflammation, as heat, pain, redness, and swelling; is clearly defined, and freely movable upon the subjacent tissues; whereas inflammatory engorgement gradually loses itself in the surrounding tissues, remaining adherent to the structures beneath. Also, the peculiar sensation imparted by the former to the touch, which, from its hardness and resistance, has been aptly compared to a "split pea," is a valuable diagnostic sign, strongly contrasting, as it does, with the soft, doughy feel of the swelling occasioned by ordinary inflammation.

Specific induration rarely, if ever, subsides immediately succeeding cicatrization of the chancre, but in the majority of cases will be found to continue two or three months, and in exceptional cases, for several years.

There is, however, another variety of induration, in which the deposit is confined to the mucous membrane, not involving the subjacent cellular tissues, and which is known as the "parchment induration." This form, which is the least frequent, derives its name from the fact of its presenting to the fingers a peculiar sensation, as if the erosion rested upon a thin layer of parchment. It is more commonly found upon the walls of the vagina and the margin of the anus; whereas the best examples of the former variety are

Fig. 160.



The common seat of Chancre—the sore presenting characters of an indurated base, and is designated as the Hunterian Chancre.

seen developed at the base of the glans penis, upon the internal surface of the prepuce, and upon the lips.

Phagedena is a comparatively rare complication of chancre, and when present, is generally limited to the surrounding induration, though it may become extensive; in which case the subsequent symptoms are particularly apt to be greatly aggravated. Babington writes: "The secondary symptoms which follow the phagedenic sore are peculiarly severe and intractable. They commonly consist of rupia, sloughing of the throat, ulceration of the nose, severe and obstinate muscular pains, and afterward inflammation of the periosteum and bones. Similar complaints will follow the ordinary chancre; but when they follow a phagedenic sore, they are very difficult to be cured; and it is not uncommon that the constitution of the patient should at length give way under them, and that the case should terminate fatally."

Other observers have noticed, in addition to this, that there is always a marked correspondence between the degree of ulceration of the chancre and the severity of the succeeding symptoms. Thus, a rapidly-developed and destructive chancre, by indicating the degree of activity of the syphilitic poison, indicates severity of the succeeding symptoms.

The **duration** of chancre is variable, continuing, as a general rule, however, from three to five weeks; though it not unfrequently happens that it remains for quite a period after the occurrence of secondary symptoms. Its transformation into a mucous patch during its reparative stage is an occurrence occasionally met with more frequently upon the mucous membranes than elsewhere, and was first observed by M. Ricord. According to Davasse and Deville, the surface of the chancre first loses its grayish appearance, and fills up with florid granulations, commencing at the circumference, as in the ordinary period of repair; at the same time there appears a narrow white border of plastic material around its margin, which extends toward the center, finally covering it with a membranous pellicle, characteristic of a mucous patch.

Provided the patient do not come under the observation of the surgeon until this change has occurred, it will be wholly impossible to determine whether or not the mucous patch is the result of the transformation of a primary into a secondary lesion, or produced in some other manner.

Diagnosis.—The diagnostic signs which can the most confidently be relied upon are its period of incubation, the induration of its base, and the attendant affection of the neighboring ganglia. The latter signs are rarely, *if ever*, absent; but, notwithstanding they may admit of variation or be wholly wanting in particular cases, it is still to be observed that they are quite as valuable pathognomonic indications as are found within the whole range of symptoms peculiar to any other disease. The affections with which it is most liable to be confounded are chancroid, simple excoriations, abrasions, and balanitis.

The differential diagnosis of chancre and *chancroid* has already been given in the synoptic table on page 499.

Simple *excoriations* from intercourse with women subject to acrid discharges, or *abrasions* arising from friction of the pantaloons, injury during connection, etc., often sustain so strong a resemblance to the superficial form of chancre that it is with difficulty a distinction can be made. A little time, however, will serve to remove all doubt, as the ulcers arising from such causes are usually surrounded by an inflammatory border—not an *indurated* one, as in the specific lesion—and are of short duration, readily yielding to the most simple treatment.

In *balanitis* the inflammation is generally widely diffused, implicating the whole of the prepuce and head of the penis, the discharge being profuse and of a thick, muco-purulent character from the commencement. The ulceration is not circumscribed as in chancre, nor is it accompanied by a tendency to destruction of the tissues.

Urethral Chancre.—Urethral chancre, which is of comparatively rare occurrence, is liable to be confounded with chancroid and gonorrhœa. In ordinary cases, however, it is readily distinguished from these affections by its period of incubation, the characteristic induration of the sore, and the attendant implication of the neighboring ganglia. The induration is easily detected by passing the finger along the line of the urethra, and will be felt to be circumscribed and exceedingly hard; while the inflammatory engorgement peculiar to chancroid is diffused, more transient, painful, and tender on pressure. The persistence of specific induration will also enable one to distinguish between it and the hardness occasioned by inflamed follicle often met with in gonorrhœa. The discharge, too, is quite dissimilar in character from that of the latter complaint,

being scanty, thin, serous, and often mixed with a quantity of blood; while the pain produced by micturition is confined to a particular point indicating the seat of the chancre.

Treatment of Chancre.—The treatment of chancre materially differs from that of chancroid. The opinion formerly entertained, that chancre was a local affection merely, unconnected with contamination of the system until some days after the appearance of the ulcer, and that its early and effectual cauterization prevented infection of the system, is proven by modern research to be erroneous and productive oftentimes of serious consequences. This treatment, also known as the “abortive treatment,” was advocated by Ricord, Sigmund, and others, who contended that *the fourth day after contagion* was the utmost limit of time when cauterization could be employed with a certainty of success. They, therefore, advised cauterization of the chancre as soon as it appeared, asserting that a full and complete destruction of the tissues beyond the sphere of the syphilitic virus would preserve the patient from contamination, the simple sore taking the place of the venereal ulcer, and healing readily by the mildest remedies.

“A chancre,” says Bumstead, “is *never a mere local lesion*, as is proved by its period of incubation, by the analogy of other morbid poisons, and by the fact, as shown by repeated experiments, that its destruction within a few days, and even a few hours, *after its appearance* fails to avert constitutional infection.”

The average duration of the incubation of a chancre is fifteen days. During this period the poison in contact with the tissue exhibits little or no trace of inflammatory action; “and hence,” says Bumstead, “the subsequent appearance of the chancre can only be ascribed to the reaction of the absorbed virus.” This, if true, invalidates the abortive theory as advocated by Ricord and others, since the sore very rarely appears until *after the fourth day*, and hence the cauterization *within four days* after contagion accomplishes little or no good in chancre. The truth, no doubt, lies in the fact that *chancre* has been mistaken for *chancroid*, and the deductions by Ricord of the “thousands” of successful cases treated by this method really and in fact attest the truth of the cauterization treatment as applicable to chancroid only. All morbid poisons, when introduced within the system, are almost instantaneously absorbed; and this is demonstrated by

the following observations of Bousquet, Renault, and others. The first-named surgeon, in a treatise on vaccination,* says that he introduced the vaccine virus under the integument, and immediately afterward cupped the part, and subsequently bathed it with a solution of chlorinate of soda. In spite of all these means the formation of a pustule went on as if nothing had been done. Renault,† surgeon of the Veterinary College in Alfort, frequently inoculated horses with glanders during the acute stage of the disease, and within one hour afterward excised the part and cauterized it. Notwithstanding these precautionary measures, the animals contracted the disease and died. Further experiments illustrating the rapid absorption of morbid poisons have frequently been made upon inferior animals with the same effect as above stated. The smallest inconceivable atom of syphilitic poison, when brought in contact with an appropriate surface, will speedily develop a disease which, if permitted to progress, may occasion the most horrible consequences both local and constitutional, and so contaminate the solids and fluids of the body as to render it transmissible from parent to offspring. "As a little yeast," says Gross, "may impregnate a large mass of dough, and cause a ferment that shall affect every particle of gluten entering into its composition, so a little syphilitic virus, so minute as to be utterly inappreciable by our senses, may affect the whole system and poison every avenue of life and health." There is no doubt that the actual latent period of the syphilitic poison is exceedingly short, the virus beginning to act as soon as brought in contact with the appropriate surface. This is demonstrated in a case recently occurring in the author's practice, wherein a distinct chancreoid was formed within twenty hours after an impure connection, although, immediately following the intercourse, the person bathed his genitals thoroughly. There is sufficient evidence to prove (had I space to introduce it) that the syphilitic virus reaches the general circulation in an exceedingly short space of time after its deposit upon the appropriate surface, although the evidences of poison (*the chancre*) may not be developed in several days, or even weeks.

"Numerous cases," says Bumstead, "are recorded in which destructive cauterization within a few days, and *even a few hours*

* *Traité de la Vaccine.*

† *Gaz. Med. de Lyon*, March, 1858.

after the development of the chancre, has failed to avert constitutional infection. Diday has thoroughly cauterized chancres four days and a half, and others five days, after coitus, and secondary symptoms have still appeared. In another case, occurring in a patient who had watched himself with the greatest care from day to day, and almost from hour to hour, the chancre was not developed until a month after the sexual act, but the *abortive* treatment was applied within *six hours* of its appearance; the sore healed in the course of three days, but secondary symptoms appeared three weeks afterward."

The author has under treatment at the present time a young man who is a syphilophobist, and therefore exceedingly careful of his genital organs, who presented himself for treatment with a chancre fourteen hours old. The sore was immediately cauterized with nitric acid, and in one week it had entirely healed over, leaving a hardened base, when the cicatrix was pressed between the fingers. At the same time, *merc. solub.* was given three times a day internally. The induration left by the healing of the cicatrix still continuing, attention was directed to the condition of the inguinal glands, three of which were found indurated and knotty, feeling, when pressed upon, like peas under the skin. Two weeks after this, a decidedly copper-colored eruption was manifest over the whole body, which gradually subsided under the internal use of *nitric acid*, second, four times a day.

Langston Parker* remarks that he "has destroyed an ulcer thoroughly and completely, and all the surrounding tissues to the depth of half an inch, in two hours after the appearance of the chancre, and yet bad constitutional symptoms have followed."

It is, therefore, fairly to be inferred that the so-called "abortive treatment" is not only erroneous, but is fast losing the confidence of intelligent and observing medical men. There are abundant evidences to prove that the best-directed abortive means have failed to preserve the system from infection, and on this account it is unreliable and unsafe as a method of treatment.

Though cauterization as abortive treatment is inefficacious as to the *chancre*, it is not to be inferred, therefore, that it is inapplicable to the cure of the venereal *ulcer*. Bumstead recommends the

* Modern Treatment of Syphilitic Diseases, 4th ed. p. 119.

limit of its application “ to those few chancres which are complicated with phagedena, and to those cases in which conjugal relations and the necessity of secrecy render it desirable to effect cicatrization of the sore as speedily as possible, in order that coitus may be indulged in with comparative safety. When employed, the effect upon the ulcer is much the same as with the chancroid; cicatrization is hastened, but induration reappears in the wound, and general symptoms are developed within the normal period.”

The local applications to chancre are much the same as in chancroid. Our object is to check ulceration and favor the granulating process. In the superficial variety—by far the most frequent form—the degree of ulceration is so slight that the milder applications may be advantageously employed. These consist of the *lotio nigra* (black wash), *lotio flava* (yellow wash), *calendula*, *phytolacca*, and *hydrastis* lotions. “ When the ulcer is not placed beyond our reach by a contracted foreskin,” says Yeldham, “ a piece of cotton wool soaked in weak *calendula* lotion should be applied to the part, and changed twice a day;” and if, in consequence of phimosis, the chancre can not be reached, the foreskin should be thoroughly washed out by syringing it well with warm water, and afterward inject with the *calendula* lotion. The *hydrastis* and *phytolacca* lotions I have largely used as an application to chancre, with the most satisfactory results, even when it seemed to withstand the action of the former remedy. *Aromatic wine* is a remedy of considerable repute among surgeons; but I am convinced from much observation that the preparations ordinarily used by the allopathic school are inferior in point of curative power to the *hydrastis*, *phytolacca*, or *calendula* lotions. *Carbolic* or *phænic acid* has attained considerable repute as a local application in chancre. Its recent introduction in the armamentaria of syphilitic remedies, and the good results already acquired, point to it as a remedy of much value as an external agent in the treatment of this affection.

General Treatment.—The general treatment of syphilis has reference not only to the remedies administered internally, but comprehends also a due regard to hygiene and those laws which, by their observance, assist in strengthening the nutritive functions. These consist in a general regularity of life; the use of simple but nutritious food; total abstinence from the use of tobacco and stimulants;

attention to cleanliness, and the preservation of the healthy secretions of the skin, kidneys, bowels, etc.; and, lastly, the possession of a cheerful disposition.

The *diet* should be plain and sufficiently nourishing, that nature may be sustained in her attempt to eliminate the virus from the system. The habits should be regular and systematic, especially as regards the hours of eating, sleeping and exercise. In those patients who have for a long series of years been addicted to the daily use of stimulants, it is recommended that they be not entirely and suddenly deprived of them, but that they be permitted to use them once or twice a day, with their *meals* rather than upon an empty stomach. High livers, on the other hand, should be restricted in the quality and quantity of food, and be brought as soon as possible to a plain, unstimulating but nutritious regimen. The functions of the skin should be promoted by moderate exercise, bathing, and friction. The patient should be warmly clad, and the use of flannel enjoined, summer and winter, adapting its texture to the degree of temperature and atmospheric changes: Sexual intercourse may be indulged in moderately, but always under the advice of the surgeon, and then only as a relief to the overcharged organs. It has been frequently observed that those patients who are much addicted to sexual indulgence, upon deprivation of the venereal *coitus* are led into the more pernicious vice of masturbation, which produces a profoundly serious derangement of the system, with impairment of all its functions.

The influence of the mind upon the body is nowhere more clearly witnessed than in syphilitic patients. It is advised, therefore, that the surgeon be frank and candid in regard to the curability of the disease; not buoying him up with hope of a speedy recovery, which is sure to be followed by disappointment and chagrin, nor yet delivering a gloomy prognosis, dooming him to utter and inconsolable despair. There is no disease that produces such a profound impression upon the system, even to the complete wrecking of all functional and organic action, as *syphilophobia*. To prevent this, the surgeon should be frank at the onset, and assure the patient that, though the cure may be protracted and that it may even be subject to modified relapses, yet the treatment, if persisted in, will ultimately restore him to health and constitutional vigor.

Constitutional Treatment.—The constitutional treatment of

primary syphilis has undergone considerable modification, according to the prevailing theories of the day. The doctrine that *mercury* acted as a specific against the syphilitic poison, as advocated by Hunter and others, was so firmly established in the early part of the present century, that no sore was considered cured without the impression produced by that agent. All ulcers cured, therefore, without the use of this drug impression, were claimed to be of a non-syphilitic character, and proofs were strongly urged advocating this doctrine. The observations of army surgeons, founded upon the experience of cases treated during the Peninsular war, led to the introduction of a modification in its treatment, viz: the *simple* or *non-mercurial* plan, which obtained for a time considerable favor among surgeons. Later still, a reaction has taken place in the minds of medical men, and mercury is again resorted to in the treatment of this disease, in quantities, however, largely disproportionate to the heroic doses formerly administered. It is now well established that *mercury* is not only admissible in the cure of the syphilitic poison, but that it is absolutely indispensable in all true cases of chancre. The heroic doses given by the allopathic school producing *ptyalism*, *soreness of the gums*, etc., have proven to be not only useless but absolutely destructive to the constitution, the mercurial accumulations forming a toxicæmia in the system productive of the worst and most destructive forms of constitutional poisoning. "In the old school," says Yeldham, "there is so much dread of the effects of mercury that every opportunity is seized of avoiding its use, except in the case of hard chancre, in which it is regarded as indispensable." This dread is founded upon the lamentable evidences of its destructive consequences, so certain to follow its use as employed by the allopathic school of medicine. They have, to a great extent, eschewed the destructive habit of *salivation*, and now push the remedy only so far as to touch the gums, continuing the impression until all hardness in the ulcer has passed away. This, though a step in the right direction, stops far short of the truth, and allopathists of the progressive school are now beginning to learn that the power of mercury to cure syphilis does not depend so much upon the perturbing influences it produces in the system as it does upon the simple law that "like cures like." The quantity of the remedy is, therefore, even in the hands of the allopathic school, becoming "small by degrees and beautifully less."

"Of all the medicines," says Hahnemann, "used in the treatment of primary syphilis, mercury is the only one that has stood the test of experience."

Let us compare the effects of syphilis on the system with the toxicological symptoms of mercury. The following *similimum* shows the homœopathicity of the drug to syphilitic poisoning:

The *venereal poison* produces on the skin pustules, scales, and tubercles.

Syphilis excites inflammation of the periosteum and caries of the bones.

Syphilis produces inflammation of the iris.

Syphilis produces ulcerations of the mouth and throat.

Syphilis produces enlargements or hardening of the glands.

Syphilis produces "chloroanemia," a diminution of blood corpuscles, and an increase in the proportion of serum.

Syphilis produces ulcers on the organs of reproduction.

Mercury produces, says Pereira,* several forms of skin diseases.

Mercury produces inflammation of the bones or periosteum, says Pereira.†

Mercury produces a disease called "mercurial iritis," says Pereira.‡

Ulceration of the mouth and throat is a well-known effect of *mercury*, says Pereira.§

Mercury produces enlargement of the inguinal and other glands, says Deterich.

Mercury diminishes the coagulability of the blood and increases the proportion of serum.

Mercury does the same.

Thus it is seen that the assertion of Bumstead, "that the elastic principle of '*similia similibus*' is also made to cover" the use of mercury in syphilis, although intended as a reproach to the homœopaths, is *proven* not only to be true by the authorities above quoted—of which the learned doctor should take note—but, also, that the drug, when given to cure the venereal poison, does so upon the *principle of similars*. The difference between the two schools, then, consists in this: that while the homœopaths cure the disease "*tuto, cite et jucunde*," the allopaths, by their *potent* doses, doom the unhappy patient to salivation and its attendant horrors, which, according to M. Druitt's own confession, is *useless*, except to show that "the system is affected." "My own opinion is," says Prof. Gross, "that the more simple and gentle the mercurial course is, the better." If the learned author had stopped here, and

* Elements of Materia Medica, vol. 1, p. 588. † Ibid. ‡ Ibid.

§ Pereira's Materia Medica, vol. 1, p. 589.

not added the concluding sentence, that "it should be carried just far enough to affect the gums, and no further," he would have conferred one of the greatest boons upon suffering humanity. This boon, however, is conferred upon man by homœopathy, and thousands of cases of syphilis, from Hahnemann's time to the present, cured by the *small* dose of mercury, potently attest the truth of the doctrine of similia.

Mercurials.—The real question, then, in connection with the use of mercury in syphilis has reference, first, to the principle on which the remedy is administered; second, the form and potency of the drug required to subdue the venereal poison. Besides the evidences produced to show that it acts upon the principle of similia, Erichsen says: "I am certainly of opinion that it does act as a *specific* in cases of primary syphilis." Abundant authorities could be named to establish the truth of the statement made by the author just quoted, if required.

As regards the form and potency of the remedy, homœopaths are divided in opinion, some contending that the *lower* attenuations of the drug are most promptly curative; while others, with equal weight of testimony, declare the *higher* potencies to be most efficacious. The views of Dr. Yeldham, as clearly set forth by himself, more closely than any other correspond with my own opinion in the treatment of primary syphilis. He says: "As regards the form of medicine, I am decidedly of opinion that the black oxide of Hahnemann—the merc. sol.—is the best. In the primary chancre I seldom employ any other preparation, and it rarely fails me. As regards the quantity, I am satisfied that a considerable modification of the dose ordinarily recommended in homœopathic books is requisite. These quantities I believe to be too small. It must not be lost sight of that, in treating syphilis, we have to deal not with a disease consisting of simple functional disturbance, or in structural alteration arising therefrom, such, for example, as takes place in common phlegmon, but with a disease engendered, palpably, by the local or constitutional operation of a virulent poison. In the former case, a medicine in exceedingly small doses, acting through the agency of the nervous force, is generally sufficient to rectify the diseased action. In the latter a poison has to be neutralized, and to effect this, the remedy requires to be administered in quantities which, though still *very small*, are considerably larger."

The quantity which I have most frequently employed is from three to five grains of the second or third decimal trituration, three or four times a day, according to circumstances. After using these potencies for a week, or until amelioration in the appearance of the ulcer takes place, I resort to a higher attenuation, and continue it for a week or more, following the succeeding week with the next higher trituration, and then keeping the patient under the use of the higher potencies until the cure is complete, or it is found necessary to again resort to the lower triturations. If the chancre is exceedingly obstinate, I employ the *first* attenuation, changing it to the higher potencies as soon as improvement in the condition of the ulcer takes place. A great error in the treatment of this disease is the frequent changing of remedies, which is sometimes productive of unpleasant results. Let the remedy be well selected and diligently persevered in, and success will more certainly follow than when a vacillating course is pursued; other remedies being interpolated from time to time to correspond with the varied manifestations of the disease. In no other malady does this injunction apply with more force than in the treatment of syphilis and in the homœopathic use of mercury.

Hartmann recommends the first or third preparation of *merc. sol.*, in single-grain doses, every night and morning. If no improvement takes place within the first eight days, he gives a lower trituration of *merc. precip. rubrum*, in doses of one-sixth of a grain two or three times a day. Helmutz says: "We have repeatedly succeeded in effecting a cure in from ten to fourteen days by means of *mercurius viv.*, sixth." Yeldham regards the *merc. sol.* the best form of the medicine; he seldom employs any other preparation, and is seldom disappointed in its effects. Other preparations of mercury, the *merc. cor.*, *merc. viv.*, and the *iodides*, are employed in the cure of chancre.

Mercurius cor.—This form of mercury has many advocates in curing chancre. It will ultimately be found, say Hill and Hunt, to be "the best form of the mineral for indurated chancre. Frick, of Hamburg, produced an ulcer, with induration precisely similar to an indurated chancre, by placing some corrosive sublimate between the glans and prepuce." Laurie mentions the successful use of this preparation in cases where induration was present, and when other forms of the mineral had failed. Marcy and Hunt say

they have known the best results following the use of the corrosive, in both the primary and secondary forms of the malady. Dr. Laurie says: "In torpid constitutions, it was found requisite to have recourse to the *third, second and first of merc. cor.*, giving one-fourth to half a grain daily, until a copious discharge of healthy pus supervened, or the excavations began to be filled up with healthy granulations. As soon as either the one or the other of these changes took place, a pause of three or four days was made. At the expiration of that period, a few more doses were generally sufficient to effect a cure in the last-named instances; but in the former, if no signs of granulation made their appearance (which, however, was rarely the case), a dose or two of *sulphur*, sixth, produced a favorable effect.

Mercurius vivus.—This form of mercury in the treatment of chancre is inferior to both the preparations heretofore named, although by some authors it is highly extolled. Dr. Laurie says: "When the health of the patient is remarkably good, and the sore neither of long duration nor has in any way been aggravated by previous treatment, we have repeatedly succeeded in effecting a cure in from ten to fourteen days by means of *merc. viv.*, sixth, a few globules night and morning for about five or six days." My own experience leads me to the conclusion that it is the least reliable mercurial in the treatment of syphilitic chancre.

Mercurius iodides.—These preparations of mercury may be advantageously employed in persons of scrofulous habits, or in those cases where the primary sore and secondary symptoms co-exist. Marcy and Hunt say that the *proto-iodide of mercury* has extraordinary power in the cure of troublesome secondary symptoms in the form of cutaneous eruptions, glandular enlargements, and nodes. Dr. Wolf remarks: "Only against syphilis are *mercury* and *iodine* indispensable." Pure syphilis demands *mercury*, while a combination of syphilis and sycosis as imperatively require *iodine*. There is no question but that the iodides of mercury are best adapted to *secondary or tertiary* syphilis, and those *sycotic* complications that follow in its train. To be productive of the greatest amount of good, the *triturations* of all preparations of mercury should be employed in preference to the spirituous solutions, as it is impossible in the latter form to administer the remedy in the low potencies to insure anything like certainty of result.

When it is desirable to produce a moderate and gradual effect upon the system in primary syphilis, I have been in the habit of using the *iodides*, the second or third trituration, in doses of three grains two or three times a day; or the *mercurius sol.*, in like doses, will be found extremely beneficial. In delicate and sensitive persons, the iodides are certainly to be preferred to all other preparations, as there is less danger of irritating the system and producing injurious complications by their use. If, on the other hand, the sore is obstinate and unyielding, with a tendency to phagedena, in a constitution somewhat irritable, a rapid effect on the system being desirable, I have found the best results follow the use of *merc. corros.*, in doses of one-tenth of a grain four or five times a day, and gradually increasing the dose until the spreading chancre is arrested.

Hahnemann employed the *red precipitate of mercury* in the lowest attenuations, both in the chancroid and chancre, from the beginning of the attack; and Dr. C. Muller, of Leipsic, speaks in decided terms of the remedy in the treatment of syphilitic chancres and buboes, in whatever state they may present themselves. He advises one grain of the first trituration to be given twice a day until the ulcers have nearly healed.

In the use of *mercurials*, the continuance of the remedy must depend upon the effect produced upon the sore; it need not be continued until complete cicatrization takes place, but should be persevered in until all specific action in it has ceased and it takes on a healthy and healing condition. When this state occurs, the remedy should be continued, at lengthened intervals, for two or three weeks, or a *higher* trituration of the drug employed for the same length of time.

Cinnabar.—In a number of cases of chancre of an *indolent* character, I have found marked benefit follow the use of this remedy in the incipient stage, when other forms of *mercury* were productive of little or no good result. The trituration used was the third decimal.

Mercury may be administered by the *mouth*, by *fumigation*, and *inunction*.

Fumigation.—Mercurial fumigation has been employed in the treatment of syphilis from the earliest periods; but it soon fell into disuse, until revived by Mr. Langston Parker, of Birmingham,

England, since which time it has enjoyed more or less the confidence of the profession. Mr. Henry Lee recommends fumigation as by far the best mode of using mercury. He says "none is attended by so little mischief to the patient's constitution, and none is followed so seldom by a relapse." The following plan, recommended by Mr. Lee, is perhaps of all others the most efficacious mode of employing this process. The apparatus consists of a kind of tin case containing a spirit-lamp. In the center, immediately over the wick of the lamp, is a small circular tin plate, upon which the mercurial powder is placed; around this is a circular depression, which is half filled with boiling water. * This is placed upon the floor, and the patient sits over it or near it, on a small cane stool, enveloped in a circular cloak, or a double blanket, which answers a good purpose. During the time the patient is taking the bath, which lasts for fifteen or twenty minutes, he may inhale the vapor for half a minute or a minute two or three times during the process. After the bath is over, the calomel deposited upon the skin should be permitted to remain, the patient being cautioned not to rub it off the skin. When the body becomes sufficiently cool, the bed-clothes should be put on, and the patient remain in bed for a few hours. The portion of calomel left upon the skin becomes, by a slow process of imbibition, absorbed into the patient's system, producing the specific effects of the drug. In the absence of Mr. Lee's apparatus, a simple expedient may be employed, by heating a brick to a dull red heat, and placing it in a pan partly filled with boiling water. On the top of the heated brick the mercury is placed, and the bath conducted as before described.

Inunction.—The inunction process consists in first cleaning and softening the skin by one or more warm baths; then, at the *first* application, rubbing the axillæ and inner sides of the arm before a warm fire with one dram of the strong mercurial ointment until most of it has been absorbed, which generally requires about fifteen minutes. At the *second* application the outer sides of the arms may be selected; the outer third of the thighs the *third*, the ham and legs the *fourth*; the surface of the chest the *fifth*, and the abdomen the *sixth*—repeating the above order if found necessary.

* Mr. Lee's lamp may be procured at the various surgical-instrument makers in the East and West.

By this process, irritation and excoriation of the skin from excessive friction of any one portion may be prevented. The evening just before retiring is recommended as the most favorable period for the inunction.

Professor Sigmund, who employed the inunction process largely, recommends it as the simplest and most efficacious mode of treating the various forms of syphilis. He used it in the Vienna Hospital, between the years 1842 and 1855, in 9379 cases, with the most satisfactory results. Dr. T. G. Comstock, of St. Louis, employed the inunction method in a case of severe and protracted tertiary syphilis, with the best effects. The patient, after having withstood all other methods of treatment under the care of three or four of our eminent physicians, was finally completely cured by this process. "Although," says Mr. Lee, "it is dirty, laborious, and often little suited to the taste of those who require its aid, it is nevertheless a *very efficient way of using mercury*." It is most applicable, however, to constitutional syphilis, to which further allusion will be made under that head.

These various expedients for obtaining the specific action of mercury by allopathic practitioners are lauded, doubtless, on the ground that they prove innocuous and less injurious than the ordinary method of using this drug by the mouth. To the homœopath, however, who has nothing of this kind to fear, the triturations of the appropriate remedy are generally the most serviceable in primary syphilis and productive of the best results. "These modes recommended by Mr. Lee," says Canniff, "are the least objectionable ways of using the drug; and it may be that the desired effect can be secured *without exposing the constitution* to those *terrible effects sometimes seen*." "The effect produced upon the sore rather than the gums should be our guide," says Erichsen, "as to the proper time for discontinuing the remedy."

Acidum nitricum.—This is a remedy of considerable repute as a syphilitic agent, standing next to mercury in its power of neutralizing the ill effects of venereal poison.

"In their dread of mercury," says Yeldham, "the members of the old school are ever casting about to find substitutes for that medicine, and of these nitric acid has been lauded as one of the most powerful." Now, according to the strict application of the

homœopathic law, no one medicine can be, properly speaking, a *substitute* for another; and in the treatment of syphilis, so far from nitric acid being a substitute for mercury, it has, like mercury, its own peculiar sphere of action, which no other remedy can fill. Thus, while mercury is the proper remedy for *chancre*, in those constitutions which have not been previously poisoned by that drug, nitric acid is as essentially the appropriate remedy for *chancroid*, occurring in debilitated or broken-down systems, whether that condition be "the result of scrofula, or of the noxious influence of mercury, or of a previous venereal taint." "Mercury is more frequently called for," says Yeldham, "than nitric acid, simply because the class of cases to which it is applicable is more numerous." In those whose constitutional powers are shattered by various causes, or those whose systems have been undermined by the combined influence of syphilis and mercury, *nitric acid* is, *par excellence*, the reliable remedy. These two remedies, in certain syphilitico chancroid cases, may be alternated with great benefit. Thus, beginning the treatment with *mercurius*, the ulcer commencing to heal, has "at the end of ten days or a fortnight," says Yeldham, "come to a stand-still, or has retrograded." *Acid. nitricum* has instantly restored the healing process, which yet again, after the lapse of a few days, has required the resumption of *mercurius* to complete the cure.

"There are certain remedies, however, besides those just mentioned," says Hale,* "which have been found useful in the treatment of syphilis. They are *corydalis formosa*, *chloride of platina*, *iris versicolor*, *phytolacca dec.*, and *stillingia syl.* In my own practice," he adds, "this last-mentioned medicine has been prescribed with signal advantage, when the preparations of mercury, so much relied upon, were useless, or nearly so."

These are the general principles upon which primary syphilis can be cured. There are other drugs laid down in our medical works which are recommended for the cure of this disease; but from a long and somewhat extensive experience in the treatment of primary syphilis, I have uniformly found the remedies quoted sufficiently competent to cope with the malady, severe and persistent as it may appear. "It is, doubtless," says Yeldham, "one of the just boasts

* Hale's New Remedies.

of homœopathy that it has a rich repertorium, and is not confined to a single remedy in the treatment of any disorder, but it should equally be the boast of the medical man to cure with the smallest possible number of medicines."

§ 2.—Induration of the Ganglia.

Induration of the inguinal ganglia is a necessary attendant on chancre, forming the most constant and reliable diagnostic sign by which to determine the presence of syphilitic poison. The nature of the induration is essentially the same as that of the induration at the base of the sore, and in each instance is wholly independent of the phenomena accompanying inflammation, though in exceedingly rare cases it may become complicated with inflammatory action and terminate in suppuration.

Symptoms.—Generally within the first week, and invariably within thirty days after the appearance of chancre, the superficial ganglia in one or both groins become enlarged, indurated, and freely movable upon each other and the surrounding tissues. This condition of the glands is accompanied by little or no pain, and with only slight tenderness upon pressure. Indolence, however, is the principal characteristic, suppuration rarely, *if ever*, occurring unless the affection be aggravated by some cause independent of the influence of the virus itself, such as external violence, gonorrhœa, a strumous diathesis, coexistence of chancroid, and general debility. Notwithstanding the existence of these and other causes which may combine with the action of the syphilitic virus, still it appears from carefully-collected statistics that the development of suppurating bubo, followed by secondary symptoms, is an extremely rare occurrence. Thus, in a table arranged by Bumstead from the observations of Bassereau, it is shown that in 383 cases of chancre, attended by an affection of the ganglia and followed by secondary manifestations, there were only sixteen suppurating buboes. It is also noticeable that the number of suppurating buboes was much greater when the subsequent symptoms were severe.

The table exhibits: 1st. The number of cases of syphilis under observation which were attended by an affection of the ganglia; 2d. The number which suppurated; and 3d. The form of the eruption which subsequently appeared:

Whole No.	Suppurated.	Form of Eruption.
117.....	1	Erythematous.
42.....	5	Papular.
108.....	1	Mucous patches.
12.....	1	Vesicular.
54.....	4	Pustular.
50.....	4	Tubercular.
383	16	

In 1409 cases collected by Mr. Henry Lee, there were only 98 cases followed by secondary symptoms, while there were but *six* of these that could not reasonably be regarded as due to causes independent of the syphilitic virus. Fournier, also, states that in the large number of cases treated by Ricord at the Hospital du Midi, in the year 1856, there were only *three* which were accompanied by suppurating buboes.

Treatment.—The great majority of indurated ganglia and of indurated lymphatics require no other internal treatment than is employed in removing the general infection. External applications, as a general rule, are not productive of any marked benefit. Provided, however, suppuration supervene, the course to be pursued is the same as that recommended for suppurating bubo occasioned by chancre.

CONSTITUTIONAL OR SECONDARY SYPHILIS.

Secondary Syphilis is a term employed to designate a group of morbid phenomena, in various parts of the body, following the occurrence of chancre, with which, however, they sustain no anatomical relation. The cutaneous and mucous structures are the most frequently attacked, and may be implicated simultaneously or consecutively, or, in rare cases, one or the other may escape contamination entirely. Besides the category of symptoms peculiar to the skin, as the various forms of eruptions, and affections of the mucous membranes, as condylomata, mucous patches, and superficial ulcerations, there are other manifestations which are more or less constant, such as alopecia, onyxia, iritis, together with lymphatic engorgement in various parts of the body.

Secondary Syphilis always Preceded by Chancre.—An opinion has been somewhat extensively promulgated that it is possible for syphilitic infection of the general system to occur independently of local

lesion. In proof of this position, it is maintained that the existence of what has been termed "non-consecutive bubo," *bubon d'emblée* of the French, is occasionally due to a direct absorption of the virus from a mucous or cutaneous surface. This form of glandular enlargement was admitted especially by Astruc and Swediaur, and has been dwelt upon by later writers. I believe such an opinion to be wholly inconsistent with all experience, and it is certainly at variance with the testimony of a great majority of the most reliable surgeons of the present day, as Gross, Bumstead, Diday, Ricord, and others. That cases do frequently occur without the previous existence of any appreciable lesion of the genital organs, is indisputable; still the fact is far from establishing an exception to the law that *syphilis invariably originates in a chancre*, as will appear from the following considerations:

1. Chancres are frequently so mild and occupy such situations as to be readily overlooked, or it may be wholly impossible to detect them, especially when seated within the urethra, vagina, cervix uteri, or rectum.

2. Chancres are capable of healing without treatment, and the characteristic induration almost immediately disappears, or remains so slight as to escape notice.

3. Constitutional manifestations never follow when bubo is the only premonitory symptom.

4. In the great majority of cases of this kind, the testimony of the patients themselves was the only authority relied upon; but every experienced surgeon is well aware that, owing to ignorance of properly conducting examinations, defective memory, and the various motives for concealment, implicit confidence can not be entertained in respect to the statements of the patient.

Statistics upon this point are valuable and conclusive. Thus, of 826 syphilitic subjects treated at the Hospital du Midi in 1856, the previous existence of a chancre in 815 was established beyond the possibility of a doubt; at the same time there was no conclusive evidence that the remaining 11 did not also originate in chancre.

Of 267 cases of secondary syphilis observed by Fournier, 265 were preceded by chancre; and in 198 treated by Bassereau, only 5 patients declared that they had not been attacked by preceding symptoms.

Hence, there is no reason to believe that the specific poison of syphilis is ever introduced into the system by direct imbibition.

Period of Incubation.—The question of the latency of the syphilitic poison subsequent to the appearance of chancre is one of no little scientific interest, as well as of great practical importance. Until within a comparatively recent period it has been taught that the incubation of general syphilis is “wholly uncertain and indefinite.” Carefully-compiled statistics, however, obtained from the experience of Diday, Bassereau, Ricord, M. Puche, and others, effectually settles this point, by showing that *chancre, uninfluenced by treatment, will generally be followed by secondary lesions within three, and invariably within six months.*

Thus, from a table of 52 cases prepared by Diday,* in which the natural course of the disease was not in the least interfered with by treatment, it appears that the shortest interval elapsing between the occurrence of chancre and the appearance of the first secondary symptom was 25 days, and the longest 105 days, the average of the whole number being 46 days. The table prepared by Bassereau† is as follows :

Erythema appeared in from 20 to 30 days in.....	14 cases.
“ “ “ 30 to 60 “	66 “
“ “ “ 60 to 90 “	23 “
“ “ “ 90 to 120 “	3 “
“ in the course of the fifth month in.....	1 “
Total.....	107

Fournier,‡ from an examination of 307 cases, states that erythema most frequently occurs between the fortieth and fiftieth day ; MacCarthy believes it to be about seven weeks ; and in the four cases observed by Bumstead,§ in two roseola appeared in 40 days ; in one, mucous patches, acne capitis, and post-cervical engorgement appeared in 45 days ; and in the other case, headache, pains about the joints, and papulæ in patches, in 64 days.

In 293 cases under the care of Prof. Sigmund, of Vienna, general symptoms occurred within three months. The chancre took on

* Nouvelles Doctrines sur la Syphilis, p. 265.

† Qp. cit. p. 176.

‡ Notes to Ricord's Leçons sur la Chancre, 2d edition, p. 466.

§ Qp. cit. p. 438.

induration in 261 cases; the lymphatic glands were affected in all the fauces in 248; spots appeared on the skin in 204; and papulæ, pustules, and condylomata, either alone or combined, were present in 134. This author states that if the chancre heals without induration, secondary symptoms not appearing within three months, no further apprehensions need be entertained.*

Ricord writes: "When no specific treatment is administered for a chancre, and the disease is left to itself, six months never pass without the appearance of general symptoms; and in most cases these supervene from the fourth to the sixth week, frequently during the second or third month, and very rarely as late as the fifth or sixth month. M. Puche has verified the same fact in hundreds of cases, without meeting with a single exception."† Hence, it may be regarded as clearly established, that *secondary syphilis possesses a definite period of incubation*, which will enable the surgeon to predict with almost absolute certainty that if the patient (uninfluenced by treatment) is not attacked by secondary symptoms within six months after the appearance of venereal ulcer, he need entertain no further fears concerning his safety.

Symptoms.—In from eight to twelve days previous to the outbreak of secondary manifestations, the patient experiences a sense of general lassitude, with more or less mental dejection, which is a prominent symptom; he is gloomy, desponding, and incapable of strong mental exertion. There is loss of appetite, with constipation; urine is high-colored and scanty; countenance becomes sallow and earthy-looking, while the least exercise is fatiguing; the sleep is unrefreshing. This condition continues a few days, when the patient is suddenly seized with chilly sensations, or actual rigors, succeeded by high fever and profuse night-sweats, constituting what is known as *syphilitic fever*. The effort of nature to eliminate the poison from the system is immediately followed by various eruptions upon the skin or mucous surfaces, other morbid phenomena exhibiting themselves sooner or later.

The development of secondary symptoms is hastened by a variety of influences, such as exhaustion occasioned by severe or protracted

* British and For. Med.-Chir. Rev., January, 1857, from the Wien Wochenschrift, No. 18.

† Ricord, *Lettres sur la Syphilis*, 2d ed. p. 300.

mental or physical exertion, immoderation in diet, use of alcoholic stimulants, exposure to an elevated temperature, or to sudden changes; in short, is hastened by any cause tending to depress the vital powers.

Are Secondary Symptoms Contagious?—The opinion formerly advanced, that the symptoms of secondary syphilis are not transmissible, and which was regarded for a considerable period as established beyond all reasonable doubt, was based wholly upon the evidence afforded by the unsuccessful inoculation of secondary symptoms upon persons already laboring under syphilitic infection. Though the experiment of auto-inoculation is quite sufficient to prove the principle that successful inoculation is impossible upon persons having secondary symptoms, still it is far from establishing the hypothesis that the virus of secondary lesions is not capable of introducing syphilis in persons free from syphilitic poison. It was found, however, that the secretion of what was supposed to be chancre, but now known to have been chancroid, was inoculable with the greatest facility; and hence, a very natural and logical conclusion, considering the data, followed, viz: that primary and secondary lesions are radically distinct, the former alone being pronounced capable of transmitting the disease. This idea was most zealously defended by the most talented and experienced surgeons of the profession. Close observers, however, discovered, from time to time, well-marked exceptions to this doctrine of the non-contagious character of secondary symptoms, in the fact, that infants are often affected with constitutional syphilis at a time and under circumstances which preclude the possibility of their having been inoculated by the virus of the primary sore. Instances also occurred of the transmission of secondary symptoms from the child to the nurse. The question, though admitted by a majority of the profession, could not be permanently settled without the knowledge to be afforded by experimental inoculation of the virus of secondary lesions upon healthy individuals. The experiments accordingly instituted, though not as extensive as could be desired, owing to the fact that few persons were willing to subject themselves to the risk, are, together with the corroborating evidence furnished by clinical experience, sufficiently conclusive to establish the fact of the contagious character of a few, at least, of the symptoms of secondary. Thus, in view of

the experiments of Gibert,* sustained by clinical observation, the Academy of Medicine of Paris, at its session of May 31, 1859, adopted the following report of its committee:

1. Some *secondary* or general symptoms of syphilis are manifestly contagious. The mucous patch or tubercle holds the first rank in this respect.

2. This truth is applicable to persons in general, as well as to the nurse and nursing; and there is no reason to suppose that the secretion of secondary symptoms in infants at the breast possesses different properties from those which are known to belong to secondary symptoms in adults.

The recent investigations, also, concerning the radical distinction existing between chancroid and chancre, have, in a great measure, conduced to the removal of every valid objection that can be urged against the admission of the contagious nature of secondary symptoms.

Observation has shown, further, that the phenomena developed by the introduction of the poison of secondary syphilis do not differ essentially from the symptoms induced by the primary sore, as regards the characteristics of the chancre, period of incubation, and the type of the succeeding lesions.

Treatment.—In the treatment of constitutional syphilis, everything depends upon the proper selection of the remedy, its judicious and prolonged use, and in the adoption of such measures, hygienic and dietetic, as are best calculated to sustain the patient's constitutional powers. The question as to the propriety of the administration of mercury in constitutional syphilis, the peculiar preparation to be used, and the period of the disease in which it should be given, must be determined in a great measure by the previous treatment of the primary disease, by the condition of the patient's general health, and by the duration of the secondary symptoms. If mercurials have been given in excess for the cure of the chancre; if the patient has fallen into a cachectic state, with loss of appetite, color, spirits, etc.; if the constitutional affection has assumed the tertiary form,

* A careful compilation of these cases, together with the experiments of Waller, of Prague, Renecker, of Würzburg, an anonymous surgeon of Palatinase, Vidal, of Paris, Fournier, Rollet, and others, may be found in Bumstead on Venereal Diseases, p. 443 *et seq.*

with implication of the bones, mercury is a questionable remedy, and should not be given under any circumstances, until at least the system has been improved sufficiently to receive the mercurial impression. It is in these conditions of the system that such great benefit is derived from the use of *nitric acid* or the *iodide of potassium*; to which I shall refer hereafter. My plan has been to give the acid and potassa every alternate week until the system is fully restored. When there is great emaciation, much benefit will be derived from some of the ferruginous preparations, for the purpose of restoring the vigor of the nutritive and reparative functions, and by improving the general tone of the system, thus enabling it to resist more effectually the inroads of the disease. In such a condition, great advantage will result from an alternation of *iron* and *nitric acid*, the former to increase the tone of the system, the latter to check the advance of the syphilitic poison. It has been remarked that the intensity of the syphilitic development is in a direct ratio with the constitutional cachexy, hence the administration of these two remedies is so often productive of such beneficial results. I do not think that by the use of these remedies the syphilitic poison can be entirely eradicated from the system; they will, however, materially assist in imparting tone and vigor to the already shattered constitution, and place it in a position to receive the mercurial impression advantageously.

No one form of mercury can be used exclusively in all cases and in all stages of the disease. A preparation which is curative in one person produces no good effect in another, the form of the remedy depending entirely upon its homœopathicity to the case viewed in all its bearings. Again, it is found advantageous in some instances to change the form of the mineral—that is to say, the iodides may be substituted for the corrosive, the corrosive for the solubilis or the iodides, according as their therapeutic action is *en rapport* with the characteristics of the case under treatment.

Iodides of mercury.—Of all the preparations of mercury applicable to the successful treatment of constitutional syphilis, there are none, in my opinion, that equal this form of the drug. It is unquestionably superior to all others in influencing directly and permanently the venereal poison. “When, therefore,” says Yeldham, “a well-marked and undoubted case of secondary eruption presents itself, following closely, or at no great distance, upon the

primary disease, and in which the patient has not been mercurialized, it is well to commence the treatment with one of the lower dilutions of the *iodide* or *biniodide of mercury*, the second or third decimal, in two-grain doses twice a day. This should be steadily persisted in until the eruption has vanished, or until it appears certain that the medicine has effected all the good that can reasonably be looked for from it. In many constitutions these eruptive disorders are extremely obstinate, and no remedy will exercise a sudden influence over them." The *mercury* having had a fair trial, if it fail in effecting a complete cure, another remedy must be resorted to; and the next in importance is the

Kali hydriodicum.—This drug is unquestionably of great service in the treatment of constitutional syphilis; not that I believe it is capable of eradicating the poison from the system, but rather from its action for a time the constitution is placed in a better position for the reception of the mercurial impression. I do not believe that syphilis can be eradicated from the system by the use of this drug alone; in fact, my own observations teach me that no case of constitutional syphilis has ever been cured by this remedy alone. The patients in which the *kali hyd.* has exercised the most beneficial influence are those in which *mercury* has been injudiciously administered either in the primary or secondary stage of the disease, by which the natural vigor of the system has been undermined. Under such circumstances a course of the *kali* or of the *nitric acid* should always be insisted on previous to the administration of *mercurials*. In obstinate cases, also, and especially in scrofulous patients, it is an excellent plan to alternate the *iodide of mercury* with the *kali hyd.*—not in alternate doses, but in alternate weeks, giving the *iodide* one week and the *kali* the next, and so on. To obtain its full curative action the remedy should be given in the lower potencies. The chief indications for its use are a previous injudicious administration of mercury, and a scrofulous and debilitated constitution, in which the vital powers are deteriorated by pre-existing influences. The dose is two or three grains of the salt three times a day in aqueous solution.

Persons are frequently met with who have used the hydriodate of potassa for months, and even years, and who continue it, not for the purpose of curing the disease, but to keep their symptoms in check. Bumstead mentions the case of an old man in attendance

upon the New York Eye Infirmary, whose face was deeply scarred and nose sunken from the effects of syphilis. This man had used the iodide of potassium for ten years, purchasing the salt and mixing it for himself, taking the enormous quantity of an ounce a day. Melsens and Guillot have proven that iodide of potassium is capable of rendering *soluble* any of the mercurial compounds within the tissues of the body, and causing their elimination through the secretions of the kidneys. The mercury having been thus rendered soluble by the action of the iodide of potassium, is again capable of exercising its poisonous effects upon the system; and this may explain the salivation that sometimes ensues after a mercurial course and during the use of the potash.

Acidum nitricum.—This remedy has also enjoyed a widespread reputation in the cure of secondary syphilis, and like the *kali hyd.*, I believe its curative virtues consist not only in restoring the vigor of the nutritive and reparative functions, and thus enabling the system to resist more effectually the advance of the disease, overcoming it, as it were, by the constitutional vigor it imparts to the constitution, but also in neutralizing to a certain extent venereal poison. It is an excellent antidote, also, to the poisonous influences of *mercury*, and, like *kali*, is eminently useful in subduing the cachexy arising from an injudicious use of that drug.

I have found most benefit in the second or third dilutions, in doses of five to ten drops three or four times a day. Its particular spheres are the *mucous patches*, *mucous tubercles*, and *general weakness of constitution*, denoting that the system has been poisoned by mercury, or shattered by the disease itself; and it possesses a decided curative action in the secondary affections of syphilis, especially in broken and cachectic constitutions.

Aurum muriaticum.—This remedy possesses great efficacy in the treatment of secondary syphilis. The late Dr. Taft, of New Orleans, employed it in secondary eruptions and ulcers which would not yield to *mercury*, it is said, with the most gratifying results. "In syphilitic eruptions of long standing," say Marcy and Hunt, "we have often administered it with entire success. The second or third trituration may be employed in half-grain doses night and morning as long as necessary."

Iodium.—The preparations of iodine are also exceedingly beneficial in the cure of constitutional syphilis, in doses of five drops of

the third or sixth decimal dilution three times a day, in aqueous solution. I have never observed that the remedy in its simple state possessed any advantages superior to its combination with mercury; and in the latter form it unquestionably possesses great value.

Phytolacca dec. — "This remedy has been successfully used," says Dr. Hale, * "in syphilitic ulcers of the throat, after *nitric acid* and *mercurius* had failed. In secondary and tertiary syphilis, ulcers, eruptions, throat and nasal diseases, bone-pains, etc.," says the same author, "and for the cure of syphilis and mercurio-syphilitic disorders, the *phytolacca* is quite equal to any other organic remedy." It has been employed with considerable success in syphilitic ulceration of the tonsils, the mucous patches with their fissures, *swellings* of the glands of the mouth and neck, and in periosteal rheumatism dependent upon syphilitic taint. I have used the remedy often as a local application to the chancroid with most excellent results; and also in mercurial cachexia I can bear testimony to its curative properties. It is a remedy that possesses undoubted curative powers in secondary syphilis and the complications that follow mercurial salivation, and should be more extensively relied upon in the treatment of these diseases. It may be used both internally and externally.

"*Corydalis formosa* is a remedy," says Hale, "that has some curative influence over syphilis." My experience with the drug is limited. In *three* cases of constitutional syphilis, manifested by nocturnal pains, ulcerations in the throat, nodes, loss of hair, eruptions upon the surface, etc., etc., it produced the most surprising as well as satisfactory results, curing these cases so rapidly that it seemed possessed of almost magical powers. All three of the patients had been under allopathic practice, diligently and faithfully tried, before submitting themselves to my treatment, and in eight weeks or thereabouts complete and permanent recovery ensued by the use of this remedy. I began the treatment with twenty drops of the tincture three times a day for one week, or until amelioration in the symptoms took place; then either decreased the dose or lengthened the interval, as circumstances seemed to warrant, keeping up a slight drug impression for at least two months after the cure was established. I can confidently recommend it as a valuable

* Hale's New Remedies — subject, *Phytolacca*.

addition to our armamentaria, and worthy the attention of the profession. It seems to possess in a remarkable degree the therapeutic properties of *kali hydriod.* and *nitric acid*, without any of the injurious consequences that sometimes ensue from their use.

Fumigation and Inunction.—In those cases of uncomplicated constitutional syphilis where the skin and superficial structures are chiefly involved, *mercury* may conveniently be administered by fumigation or inunction. Mr. Langston Parker highly recommends a combination of vapor-bathing and of mercurial fumigation; and this gentleman strongly advocates this mode of curing syphilis as shortening the duration of treatment and permanently curing the disease without the constitution of the patient being *in any way injured* by its employment. Appropriate internal treatment may also be associated with this process. When the disease occurs in scrofulous constitutions, along with the remedies advised, *sulphur* and *stillingia* may be employed according to their respective indications.

Professor Sigmund, of Vienna, who has enjoyed abundant opportunities for treating this disease, says that mercury, when given by inunction, is far safer and eminently more curative than its internal administration. The author divides the cure of syphilis into *three* periods: *the preparation of the patient, the inunction, and the after-treatment.*

The preparation of the patient.—Before commencing with the inunction process, it is necessary that the diet be regulated and all complicated derangements cured, or at least ameliorated. Baths must be taken once or twice a day for a week or more, until the cutaneous surface may be in a proper activity to absorb the mercury.

In regulating the diet, regard must be had to the constitution and habits of the patient; but, as a general rule, all strong spices and spirituous liquors must be gradually withdrawn, and a milk diet, with pure water as a beverage, insisted upon. The function of the skin must be excited by warm clothing, and by the patient's remaining longer in bed than usual. The baths must be of a temperature of 85° to 92° Fahrenheit. The diseases most liable to interfere with the cure are *diarrhæa, hemorrhages, intermittent fever, acute pulmonary catarrhs, and caries of the teeth.* The condition of the gums must also be looked after, and if any evidence of

disease exists, the frequent application of *tannic acid*, *hydrastis*, or *rhatany*, in aqueous solution, by means of a camel's-hair brush, must be insisted upon. The temperature of the patient's room should be from 70° to 72° of Fahrenheit; all draughts of air must be avoided, and the apartments ventilated every morning.

The inunction.—The gray ointment, composed as follows, is the favorite formula of the author, which is divided in eight equal parts, and two portions used at each inunction:

R.—Ungt. hydrarg. cin., ℥ij;
Ungt. hydrarg. fort, ℥j. M.

The inunctions are generally made alternately upon five different regions of the body: 1. Upon both legs; 2. Upon both thighs; 3. Upon both anterior halves of the chest and abdomen; 4. Upon both dorsal surfaces, from the nape of the neck to the hips; 5. Upon both arms. The most convenient time for inunction is just previous to going to bed. If the patient is intelligent and able to perform the operation himself, he must be enjoined always to rub the salve in one direction—downward. After the process is finished, the anointed parts are to be enveloped in a linen or woollen cloth and left so until morning, when they are to be well washed with warm castile-soap and water, and, as soon as thoroughly dried, to be again warmly covered. No oil-silk, India-rubber, or other substance, should be used, as they have a tendency to increase the perspiration to an injurious degree, and thus favor the development of inflammation. The linen of the bed and the patient's clothing should be changed every day, but caution must be observed to prevent his taking cold. The *quantity* of the ointment to be used varies in individuals; adults require from twenty to sixty grains, and children from six to fifteen grains, daily. The *number* of the inunctions depends upon the judgment of the practitioner. They are to be discontinued when there is reason to believe that the cure is achieved, or their continuance is prevented by counter-indications. Usually from twenty to forty are sufficient, and only in severe or exceedingly obstinate cases is the number to be augmented. During the inunction treatment the patient should remain in bed at least eighteen hours daily; moderate perspiration should be induced one or two hours daily by keeping the patient's body well covered. Tobacco, during the cure, is positively prohibited.

After-treatment. — For syphilitic ulcers in the mouth and fauces, a solution of *corrosive sublimate*, one grain of the salt to a pint of water, is exceedingly beneficial. *Hydrastis* and *phytolacca* lotions serve an excellent purpose; also the chlorate of potash as a gargle. Where there are no ulcers, one ounce of *alum* to a pint of water, also *tannic acid*, *tincture of nutgalls*, *borax*, and a *diluted tincture of iodine*, are very useful. If the gums are loose and spongy, swollen, and bleed easily, they must be brushed six or eight times a day with tincture of nutgalls or myrrh; and when very painful, with an aqueous solution of the acetate of morphia. *Nitric acid*, in the proportion of three drops to an ounce of water, has proved in my hands a most excellent remedy in this condition, as has also the *hydrastis* and *phytolacca* lotions.

Pregnancy does not prohibit the inunction cure; on the contrary, it seems to exercise a beneficial effect upon the mother, while it protects the fruit of her womb from this dire disease. *Abortion* has never been known to follow the inunction cure. A temporary discontinuance of the process is sometimes necessary in any unusual pathological conditions that exist during pregnancy. In cases of *lying-in* women affected with constitutional syphilis, the inunctions may be discontinued, if not indispensable, for two or three weeks, and even longer, if time is required to regain their strength. In cases of *mothers* who will *nurse* their children, the author recommends that both mother and child undergo the cure. The *season of the year most favorable* to the inunction cure is spring and the early part of summer, provided the case be not of too urgent a character.

On the day of the last inunction, the patient must take a soap bath of from 85 to 90 deg. Fabr., of half an hour's duration, and after that he may gradually return to his accustomed mode of living. If the patient show a disposition to gout, rheumatism, or frequently-repeated affections of the muscles, periosteum, and joints, *sulphur* is a valuable remedy. If affections of the glands and bones, and frequent congestions to the mucous membrane of the palate, tonsils, and nose occur, the preparations of *iodine*, such as *kali hydriod.*, *natrum iodid.*, and *ferrum iodid.*, are of great service in controlling these derangements. Other complications will have to be treated by appropriate remedies as they are developed during the inunction process.

In obstinate and unyielding cases, I have employed the system of inunction as recommended by Prof. Sigmund, with the most successful results, and in one instance a cure was effected by this plan that had resisted the ordinary treatment of both the allopathic and homœopathic systems. I can, therefore, confidently recommend it to the profession as an expedient of great value in the cure of constitutional syphilis, and especially in those cases where the remedies ordinarily administered have failed to produce a satisfactory result. Whatever course of treatment be adopted, it is recommended that after the remedy or remedies have been carefully selected they be continued for a *sufficient length of time*, or have their inadaptability *proved* before a change of medicines is determined upon. I have often witnessed evil results follow the intercepting of a proper and judicious course of treatment by too frequent changing of remedies, the practitioner contenting himself to combat new symptoms, and satisfied with the removal of some slight local mischief, while the disease is left to run riot in the constitution.

SECTION VII.

SYPHILITIC LOCAL AFFECTIONS.

I shall next consider the different local forms in which constitutional syphilis manifests itself, without reference to the mere arbitrary terms of *secondary* or *tertiary* forms. The distinctive character of the phenomena presented by these so-called types of syphilis is not well marked, the symptoms of the one merging into those of the other by an almost insensible gradation, so that it is impossible to say when the secondary terminates and the tertiary begins. The textures particularly liable to become implicated include the skin, mucous membranes, testicles, aponeuroses, tendons, fibrous and osseous structures.

It has been the very-generally-received opinion that the symptoms of tertiary syphilis are not transmissible by inoculation or by hereditary descent; still it is to be remarked that no well-conducted experiments have ever been made to determine definitely whether or no tertiary symptoms may not be communicated to persons free from syphilitic infection. Respecting the hereditary character of

the symptoms, however, there seems little doubt that in some instances the symptoms have been transmitted, still preserving their peculiar type. The occurrence of syphilitic hepatitis and deep tubercles of the subcutaneous cellular tissues have been frequently observed, together with a deposit in the brain of a substance peculiar to tertiary syphilis, in infants having syphilitic parents. Generally, however, it is probable that the hereditary influence is manifested in imperfect development, with a predisposition to various kinds of cachectic affections, rendering the constitution of the offspring weak and incompetent to withstand the various influences having a tendency to provoke disease.

The syphilitic affections of the skin, *syphilides* or *syphilodermata*, manifest themselves, according to the classification of Cazenave, under the following seven varieties of form :

1. The *exanthematous*.
2. The *papular*.
3. The *squamous*.
4. The *vesicular*.
5. The *bullous*.
6. The *pustular*.
7. The *tubercular*.

The first three varieties appertain more particularly to the early or secondary order of symptoms, whereas the remaining occur at a later period, and are to be regarded as belonging to the third stage of the disease.

Syphilitic cutaneous diseases often sustain so marked a resemblance to various forms of eruptions dependent on other causes than the poison of syphilis, that much care is frequently required in order to determine with certainty the true character of the affection.

Diagnosis.—In ordinary cases, the diagnosis of the syphilides is readily established by observing :

1. The *history of the case*, especially respecting the previous existence of primary symptoms.
2. The *color of the eruption*.—This is an important diagnostic sign, but is by no means constant; and may be simulated by other forms of skin disease. Thus, the reddish-brown color of the cicatrices of lupus, variola, and acne, may easily be mistaken for the peculiar *copper-color* complexion of the eruptions of syphilis.
3. The *circular form of the eruption*.—This sign is valuable

particularly in the forms of eruption occurring in the tertiary stage, but is often absent in the erythematous and papular eruptions of the early stage of syphilis.

4. *The absence of itching*.—This is a very characteristic symptom, whereas in the ordinary affections of the skin the irritation and pruritis are often very severe.

5. *The coexistence of several forms of eruptions*.—In non-syphilitic eruptions of the skin, it is exceedingly rare that we find a union of blotches, vesicles, papules, and pustules; while in syphilis, owing to the persistence of one variety of eruption and the rapid development of another, several different forms are often present at the same time upon the same person. This peculiarity, however, is not exhibited in the later stage of syphilis.

Erythema (*Roseola*).—This variety of eruption occurs in spots of a circular shape, of a rose or pale red color, which gradually assumes a coppery tint, is most prominent on the abdomen, thorax, axillæ, and extremities, and generally terminates with slight desquamation of the cuticle.

Another variety of this eruption consists of small blotches, irregular in shape, of a reddish-brown or faint copper color, somewhat confluent, and generally occurring from one to three months after contagion.

Both varieties present no actual elevation of the skin, and are usually quite free from pyrexial disturbance and pruritis; though occasionally premonitory symptoms are marked, the febrile excitement being severe. As the eruption continues, it loses its reddish color, becoming dingy, dusky, or grayish. It may be distinguished from measles and other cutaneous affections by the coexistence of primary or secondary symptoms of syphilis, such as copper-colored papulæ upon the forehead, pustules and papules upon various other parts of the body, cervical adenitis, mucous patches, scabs on the scalp, and small yellowish scabs surmounting papular elevations at the base and sides of the nose, any or all of which may be present.

Papules (*Lichen*).—Syphilitic papules are characterized by small, solid elevations, containing no fluid, of a bright-red color, which disappear on pressure, and terminate almost invariably in desquamation. They may occur simultaneously on different parts of the body, and in severe cases the entire surface may become covered. After continuing for a time they rapidly assume a yel-

lowish-red or copper color, the skin between the agglomerated papulæ becoming of a dingy or dusky hue, has a dry, shriveled appearance, and is the seat of constant exfoliation, attended by slight itching.

They are generally slow in their development, which occurs by successive invasions, and rarely terminate in suppuration or ulceration, but are still often succeeded by depressions in the skin, which, however, disappear in the course of a few months.

The date of their appearance is variable. In 30 cases observed by Bassereau, in which no mercury had been given, the eruption occurred in 3 cases between the twentieth and thirtieth days after contagion; in 16, in the course of the second month; and in 11, during the third month. It is to be distinguished from tubercles, common lichen, and acne indurata, with which it may be confounded, principally by the presence of syphilitic symptoms.

Squamæ (*Tyriasis*, *Psoriasis*, and *Lepra*).—This variety of eruption is remarkably chronic, occurring from six weeks to three months after the primary symptoms, and often continues into the later stage of syphilis. It is characterized by the formation of distinct scales, of a dull, grayish appearance, which rest upon a copper-colored base. When developed upon the forehead, scalp, face, and perhaps the forearms, being thin and furfuraceous, they constitute a variety of the affection known as *tyriasis*.

In *psoriasis*, the scales often acquire a remarkable thickness, being hard, whitish, or grayish, occurring upon any part of the body, and usually succeed an eruption of papules or tubercles. The form of the patches determine the variety; thus, provided the spots, which are generally from three to twelve lines in diameter, are small and scattered, it produces the variety called *psoriasis guttata*; when of larger size and more or less continuous, *psoriasis diffusa*; when circular, *lepra*. The skin underneath these patches has a disposition to ulcerate, or to form troublesome cracks and fissures. The scales being dislodged, the resulting cicatrices are somewhat depressed at the center.

The squamous variety of eruption is most likely to attack weak and anæmic persons, and is commonly associated with ulceration of the throat and palate, affections of the bones, and iritis.

Vesicles.—The vesicular variety of the syphilides is the most infrequent of the syphilitic eruptions. It occurs early, being often

coincident with the latter stages of the primary symptoms, and chiefly affecting the back, face, and extremities.

The vesicles usually show themselves in groups, commencing by minute, circumscribed pimples, followed by a secretion of a transparent, serous fluid, and surrounded by a copper-colored areola. The contents, unless absorbed, develop into thin scabs, which upon removal leave their site a dingy, yellowish color.

The usual concomitant symptoms are, disease of the throat, pains in the joints and bones, and other specific eruptions, as papules, pustules, or erythema.

Bullæ (*Pemphigus and Rupia*).—Bullæ, which are characterized by the formation of large vesicles, consist of two varieties of eruption, viz: pemphigus and rupia.

Pemphigus.—This variety of eruption is chiefly met with in congenital syphilis, its favorite seat being the palms of the hands and the soles of the feet, though it is frequently found upon the arms, abdomen, and thorax, and sometimes even covers the whole body. The bullæ vary in size from a quarter of an inch to an inch or more in diameter; they are only slightly elevated above the surrounding surface; are circular, oval, or flattened, and rest upon a copper-colored base. The fluid secreted consists of a serous or sero-purulent matter.

The eruption itself possesses no characteristic signs by which it can be distinguished from the non-specific variety.

Rupia.—Though rupia is sometimes classed as a pustular affection, it is still probable that its first appearance is always indicated by the formation of bullæ. It never occurs as a result of hereditary taint, being confined in its development to subjects who have acquired syphilis by direct exposure. It first occurs as a tender, reddish

Fig. 161.



Crusts and Ulcers of Rupia.

spot, the epidermis becomes elevated by an effusion of bloody serum, which rapidly forms into a scab of a dark or greenish-yellow color, under which ulceration occurs. Succeeding scabs are produced, one under the other, forming a cone, varying in volume from the size of a pea to that of a hazel-nut, and surrounded by an areola of a dark-red

or copper color. The ulcers formed beneath are deep, circular, have a foul, grayish bottom, and hard, purple, and sharply-cut edges, as are seen in Fig. 161 (on opposite page). Severe constitutional disturbance is generally present, there being frequently a very low condition of the system. The usual concomitants are, affections of the bones, orchitis, and tubercles of the cellular tissue.

Pustules (*Acne, Impetigo, and Ecthyma*).—Syphilitic pustules may occur upon any portion of the body, being met with, however, most frequently on the scalp, and assuming the form of acne, impetigo, or ecthyma.

In *acne*, the pustules are small, circumscribed elevations of the skin, resting upon a prominent base, and which become covered, after a few weeks, with scabs of a grayish or yellowish-brown hue. The pustules are not confined to the superior parts of the body, as in the ordinary form of acne, but are often present on the lower extremities. After the removal of the scab, the surface which it occupied desquamates, presenting the characteristic copper color.

Impetigo.—In syphilitic impetigo, the pustules are small and flat, surrounded by a swollen and inflamed base, of a copper color, and soon become covered with scabs of a peculiar grayish or greenish-yellow hue. The pustules are most frequently observed upon the face, especially around the nose, mouth, and in the beard, arranged in groups or isolated; they are also frequently found upon the trunk, scrotum, and extremities.

Ecthyma.—In ecthyma, the pustules are of a large size, seated upon bright-red, hard, and circular bases, generally preserving their distinct character, though sometimes collected in groups, and followed by the formation of hard, dark, or greenish scabs. This is the most frequent of the pustular syphilides, and is found upon all parts of the body, but more especially upon the lower extremities. It commences by the occurrence of red, indurated spots, which soon become elevated in the center by an effusion of pus; broad, brownish scabs eventually covering the entire inflamed surface.

In the *superficial* variety of this eruption, which is an early symptom of constitutional syphilis, the tendency of the ulcer to increase in extent is but slight, the removal of the scab being followed by a shallow though permanent cicatrix, resembling the scar of small-pox.

The *deep* variety, unlike the former, appears as a late symptom

of constitutional infection, being commonly accompanied by orchitis, pains in the bones, and exostoses, which affections are rarely, if ever, found as complications of the superficial variety. The scabs of the deep variety continually increase in extent and height in consequence of additions of purulent matter, which give them the appearance of being formed of consecutive rings, which project over the edges of the ulcer. Occasionally, however, the scabs will not be sufficiently large to cover the entire ulcer, in which case the surrounding tissues, being inflamed and somewhat elevated, form a cavity, within which the scabs are imbedded. The ulcer beneath will be found deep, presenting abrupt, well-defined edges, and its floor covered with a grayish secretion. The cicatrices are deep and permanent, but not pitted as in the superficial variety.

It is to be remarked of pustular eruptions that their presence indicates a condition of the system favoring the occurrence of the severest form of constitutional symptoms; hence, the prognosis in syphilitic pustules is to be given accordingly.

Tubercles.—This formidable and quite frequent affection is one of the later manifestations of syphilis, in some cases occurring (according to Bassereau) as late as ten, twenty, or even forty years subsequent to contagion. They may appear upon any portion of the integument, but are most frequent upon the face, often attacking and completely destroying the lips and *alæ nasi*.

Tubercles first make their appearance as small, hard, shot-like, copper-colored eminences, arranged in groups or in perfect circles, or may remain completely isolated. They vary in size from a mustard seed to that of a cherry, are smooth and polished, produce little or no pain, and terminate in desquamation and resolution, or in severe cases pass on to suppuration and the formation of destructive ulcers.

The *hair* and *nails* are commonly affected in advanced constitutional syphilis; baldness, constituting *syphilitic alopecia*, occurring either in patches or generally without any apparent disease of the skin. Disease of the nails, *syphilitic onychia*, occurs in two forms, either as a foul ulceration between the toes, or else as a chronic inflammation with fetid discharges in the matrix of the nail, which becomes black, more or less bent, and scales off, with the formation of a dirty ulcer under its detached edge.

Treatment.—The *treatment of cutaneous syphilis* must be conducted in accordance with the general principles already laid

down. In the *roseolar* varieties, the previous management of the cure must determine the treatment. If *mercury* has been injudiciously given, and the system is suffering from the cachexy produced, recourse must be had to the *iodide of potassium*, *nitric acid*, *phytolacca*, or *stillingia*; if mercury has not been given in the primary stage, then the iodides will be found beneficial. In the *squamous* syphilide, the same directions are applicable. In the *pustular* form, the constitution is generally found considerably broken down, demanding the use of *nitric acid*, *merc.*, *corydalis*, *acid phos.*, *ars.*, *carbo veg.*, *canth.*, *china*, *sarsaparilla*, *kali hyd.*, *iodine*, and *sulph.*, and a supporting regimen. A remedy which has served me well in obstinate and cachectic varieties of this disease is the preparation of *calisaya* and *iron*, in doses of a teaspoonful three or four times a day. After the system has been sufficiently aroused by this treatment, and a fair constitutional vigor has been brought about, then the mercurial iodides may be administered with great advantage. In the *tubercular* form, the same treatment will be observed as recommended in the last variety. In this form I have frequently found excellent results follow the use of the *iodide of arsenic*, second or third trituration, three grains three or four times a day. For the papular venereal eruption, Prof. J. C. Morgan recommends *lycopodium*. For the *syphilitic ulcers* that are often seen following the primary stage, I have found much benefit from the use of cauterization with *nitric acid* or the *acid nitrate of mercury*, dressing the sore after the separation of the slough with the *muriate of hydrastis*, *phytolacca*, or *calendula* lotions. The internal treatment will be the same as in the pustular syphilide. In *syphilitic alopecia*, the internal administration of the *iodide of potassium* or the *mercurius corrosivus*, together with a supporting regimen, will be found most beneficial. In *syphilitic onychia*, the free use of *nitrate of silver*, followed by *hydrastis*, *calendula*, or *mercurius cor.* ointment, and the internal administration of the *iodide of potassium*, or the *iodides of mercury*, or *ars.*, *ant. c.*, *graph.*, *kali carb.*, *lyc.*, *nux vom.*, or *petrol.*, will be sufficient to effect a cure. Diday recommends that "the patient should wear upon the affected finger a cot, the extremity of which is filled with *emплаstrum de vigo cum mercurio*, rubbed up with a sufficient quantity of *olive oil* to give it a somewhat liquid consistence."

In all syphilitic diseases, the mercurial preparations occupy the

first rank. *Acidum nit.* and *iodine*, with their compounds, are likewise powerfully anti-syphilitic, and deserve especial attention in the case of mercurial complications; this remark also applies with equal force to *aurum* and its compounds. Next to these there are *calc. c.*, *silicia*, *mezereum*, *phytolacca*, *phosph. acid*, *stillingia*, and the class of remedies generally indicated in scrofulosis and tuberculosis.

In the external treatment of the syphilodermata, a simple warm bath two or three times a week will be found of exceedingly great benefit, especially in those eruptions which are extensively diffused over the surface. Trousseau and others highly praise baths of corrosive sublimate, containing half an ounce of the bichloride and an ounce of muriate of ammonia to each bath. These may be taken two or three times a week, according to the severity of existing symptoms. Prof. Sigmund's "inunction treatment" is of infinite service in these constitutional affections, and should receive a fair trial from the hands of the profession in such troublesome disorders.

Warts, vegetations, and excrescences.—These are frequently met in constitutional syphilis, and occupy by preference the vicinity of the mucous canals, being usually situated in the neighborhood of the anus, perinæum, and scrotum; and in the female upon and within the labia. Occasionally they are seen upon the tongue, lips, tonsils, and palate. When attacking the organs of generation, they are usually large, flat, soft, and uniform in structure and appearance, accompanied with considerable mucous exudation and perspirable moisture of the neighboring skin. When located in the mouth or throat, they are generally small and slightly elevated, and resemble most a thickened and opaque state of the mucous membrane. These *secondary warts*, *condylomata* or *mucous tubercles*, as they are sometimes termed, differ very much from the *primary* vegetations, both in appearance and character, as well as being dependent upon the constitutional poison, and not on local causes solely, such as the irritation of discharges and want of cleanliness. The fact of their contagiousness has been abundantly demonstrated.

Treatment.—The treatment of these growths must be both constitutional and local. The constitutional consists in the administration of *mercurius cor.* or *mercurius iodide*, with the alternate use of *nitric acid*, or the *iodide of potassium*, and good healthy regimen. The *local* treatment best adapted to meet this

condition is free cauterization with nitrate of silver, dressing the parts within the intervals of application with ointment of the *muriate of hydrastis* and lotion of *phytolacca*. They seldom require excision like the primary excrescences, as they rarely, if ever, become either pendulous or protuberant. See Condylomata and treatment, page 460.

Mucous membranes.—The mucous membranes of the mouth, lips, tongue, and throat, are sometimes affected with syphilitic degenerations, and, though dependent upon a constitutional taint, are nevertheless brought on by exposure to cold, or alternations of cold and moisture. They possess peculiar characteristics. In many cases the mucous membrane becomes thickened, but preserves a peculiar glossy, semi-transparent, almost gelatinous appearance; and, being irregularly fissured, they give the organ a thick and misshapen look. In other instances the epithelium is dry, white, and opaque in patches, the surface of the tongue looking as if it had been dyed white here and there. Occasionally ulcers form, irregular in shape, with indurated areola and a foul surface, resembling to a considerable extent the appearance of schirrus or epithelial cancer. Still other varieties assume a deep red, exanthematous efflorescence of the soft palate and the pillars of the fauces, either without ulceration or with but superficial abrasion, and accompanied with much cachexy, depression of vigor, and considerable pyrexia. This latter form occurs about the period of the invasion of the *roseolar* or *rupial* syphilide, and demands the same constitutional treatment, with the local application of a solution of the *nitrate of silver*.

A *deep, excavated ulcer*, with foul, grayish surface and indurated base, either oval or circular, is often met with in one or the other tonsil; it corresponds with those consecutive phenomena that follow the true chancre, and requires some of the forms of mercury for its cure. Occasionally a *sloughing ulcer* is seen upon the side of the throat or palate, giving rise to considerable swelling, a foul, whitish surface, with rapid destruction of parts, often perforating the soft palate, which, by partially destroying the veil of the palate, occasions serious inconvenience to the patient during speech and deglutition. This form of ulcer is associated with the rupial or ecchymatous syphilides, and requires the same constitutional treatment. Local applications, by sponging the parts attacked with lotions of *nitric acid*, *phytolacca*, *corydalis*, and *hydrastis*,

and gargling at intervals with the *chlorate of potash*, are productive of the most beneficial results. If there is any febrile excitement accompanying the disorder, *aconite* may be given to modify the pyrexia, as well as to act locally on the disease. *Apis*, in drop-doses of the second or third decimal, is said to possess much local efficacy; also, *belladonna* and *lachesis*; *mercurius cor.* may be administered with success if the former produce no good results. If the disease continues in spite of the remedies employed, *iodide of mercury* will be demanded, the throat getting well *pari passu* with the other constitutional symptoms. If all these fail, the inunction treatment will be found efficacious.

Diseases of Periosteum and Bones.—These affections are among the more remote and severe manifestations of constitutional syphilis, and are especially apt to occur in those cases in which mercury has been given to excess, the patient having escaped the whole course of the less severe syphilitic affections, such as the skin, mucous membrane, and the throat. Affections of the periosteum are not necessarily preceded by the manifestations alluded to, but may occur conjointly with these manifestations, and especially is this the case in scrofulous constitutions among the laboring classes.

Treatment.—The remedies mostly to be relied upon in these osteoscopic affections are *assafœtida*, *aurum*, *calcaria*, *causticum*, *fluoric acid*, *kali-jodatus*, *lachesis*, *lyc.*, *merc.*, *nitric ac.*, *phosph. ac.*, *plat.*, *petrol.*, *mezereum*, *staph.*, *sulph.*

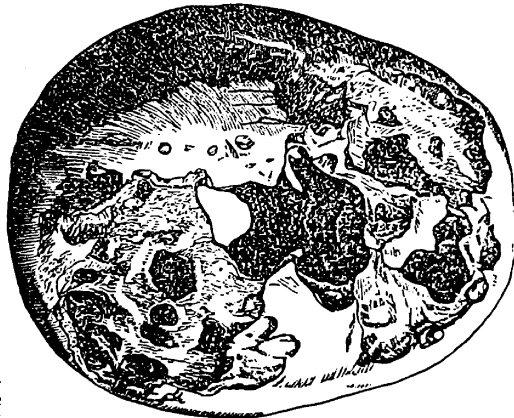
In regard to the special indications, let me observe that the principal remedies for this disease, provided the patient has not been saturated with mercury under allopathic treatment, are: 1st, the *mercurial* preparations; and 2d, the salts of potash, if large quantities of mercury have been employed; and in connection with these may be added *sarsap.*, *nitric ac.*, *fluoric ac.*, *mezereum*, *staphis-agria* and *sulphur*; the indications for the last two remedies are more positive if the region where the pain is located feels sore, as if ulcerated. *Lachesis* is useful when the mercurial preparations have been employed to excess, or if mercury and its preparations are ineffectual under homœopathic treatment.

If there should be a complication with scrofulosis, and the patient should have been troubled in childhood with weakness of the osseous system, rickets, and such diseases, the remedies upon which most reliance may be placed are *calc. carb.*, *phosph.*, *phosph. acid*, *pinus syl.*, *arsen.*, *china*, *assafœt.*, *ruta*, *sulphur*. *China* and

arsenic are more particularly called for when the constitution is much depressed and requires support.

Venereal Periostitis, or Nodes, are sometimes met with in all the superficial bones of the body, but more frequently take place upon the tibia, clavicle, radius, and ulna, and the frontal bone. The sterno-clavicular articulation and knee-joint are frequently attacked by this affection, and oftentimes become exceedingly rebellious to treatment. These tumors present themselves as indolent, uniform, and indurated swellings, at times acutely sensitive to the touch, the pain being most marked in the after part of the day, and during the night, which sometimes becomes distressing. They consist of a thickened condition of the periosteum, with plastic effusion within and underneath it, sometimes involving the bone in the diseased action. They rarely terminate in resolution, but continue permanently; if the subjacent bone is involved in the morbid action, they are disposed to take on the suppurative process. The skin over these nodular swellings is at first pale and movable, and communicates to the finger a doughy feeling or obscure sense of fluctuation. If the disease is arrested at this stage, a mere superficial deposit of rough, porous bone is produced from organization of effused lymph, or else

Fig. 162.



Ravages of Syphilitic Caries.

a consolidation of the bone itself, through the deposition of new osseous material into its cancellated structure. If the disease progresses, the serum effused under the periosteum becomes glairy, and, increasing in quantity, gives rise to an exquisitely painful and fluctuating tumor. If it advances still further, the bone becomes carious; matter forms between it and the periosteum; exfoliations more or less extensive take place; the patient suffers severely from the discharge and accompanying pains. (Fig. 162.) When this condition of things takes place upon the

forehead, it is termed *corona veneris*, and may produce death from irritation of the brain, or its protrusion through these apertures in the skull. Fortunately, however, these melancholy terminations are rare now, as compared with that era when mercury was so largely and so injudiciously administered.

Treatment.—The treatment of this affection consists in the local application of *aconite* when there is much sensibility on pressure, with *nocturnal* aggravations; when, on the contrary, the tumor is in a chronic state, with little sensibility, the tincture of *iodine* or the *emplast. vesicatorium* may be advantageously employed. Mr. Fergusson recommends, when the node is tense and full of liquid, that it be punctured by the subcutaneous incision, and the contents drawn off. For the ultimate removal of the tumor and relief of the nocturnal pains, the *iodide of potassium* is the most certain and reliable remedy. In this disease *mercury* should be given with the greatest caution, and only in those patients whose constitutions are vigorous and sound, and who have not been seriously impressed by its previous use. If ulceration does occur, it is of the utmost consequence to remove any loose or carious portions of bone as early as possible. The following remedies are often found of great efficacy in milder forms of the disease, and should be used according to their pathogeneses, viz: *acid. nitric.*, *assafoetida*, *aurum*, *phytolac.*, *iodium*, *kali hyd.*, *mezereum*, *mercurius*, *phosphorus*, *silicia*, *sulphur*.

Prof. Helmuth relates a case of ulcerated nostrils, with enlargement of the turbinated bones, and a node which gave intense pain. The patient had been mercurialized for syphilis two years previously; he was entirely cured by the use of the third trituration of *aurum mur.*, followed by *mezereum* and *assafoetida*, in the short space of four months.

For syphilitic affections of the bones, Wolf recommends *aurum*, 200, one dose every twenty-four hours for seven days.

Dr. W. Huber * cured a patient with node by the use of *viscum album*, 3, every three hours, the parts to be enveloped in cotton wadding. The fourth day the pain was quite gone and the swelling much abated; "on the seventh day not a trace of swelling or pain remained."

* British Journal of Homœopathy, vol. xxii, p. 646.

Dr. Adrian Stokes, * in cachexia syphilitica, recommends the use of the following organic remedies, viz :

“*Aconitin*, in asthenic habits.

“*Atropin*, when there is nervous irritability in chronic syphilitic disorders.

“*Podophyllin* is more reliable and certain than those of mercury, and entirely devoid of any deleterious effect. In recent as well as in secondary and tertiary forms of syphilis, he who fails with *pod.* judiciously used, need not hope to get any help out of mercurials. And when primary syphilis is treated with this and other organic remedies, secondary and tertiary forms will very rarely appear. We have never known them to appear in an extensive experience.

“*Erigeron bel.*, of one part to eight of alcohol, to stimulate ulcerated palate, etc., to heal; apply on cotton, after caustics.

“*Baptisia*, for application to foul or phagedenic ulcers, either in the throat or on the genitals.

“*Phytolacca* is quite equal to any remedy for the cure of merc.-syph. disorders. Use four days and follow with *corydalis*.

“*Corydalis* is a tonic and resolvent, and useful in broken-down constitutions. Perhaps no single agent possesses more energetic alterative and anti-syphilitic properties than this. In conjunction with *podoph.*, it has had marked success in syphilis.

“*Irisin* has few equals in eradicating the syphilitic virus. Its influence is positive and certain.

“*Sanguinarin* is of great utility for applying to foul and indolent chancres, buboes, etc. In secondary and tertiary forms of syphilis, when the system is languid and depressed, *sang.* rouses the impressibility of the nerves and prepares the way for other remedies.”

Veronica quinquefolia.—This remedy I have used in the most obstinate forms of constitutional syphilis with complete and satisfactory results. In three cases of this affection, two of which had caries or ulceration of the bone, and the other nodular disease, with a persistent and intractable syphilitic cachexy, and after all other remedies had entirely failed, though used in varied potencies, the *veronica* produced the most gratifying results, recuperating the

* On Organic Remedies, Brit. Jour. of Homœopathy, vol. xxii, p. 80.

broken-down constitution and entirely eradicating every vestige of syphilitic cachexy.

The testimony of other practitioners who have employed this remedy is corroborated by my own experience. I could adduce *many* testimonials from homœopathic physicians, of which the following is a type. It was written by Dr. W. W. Foster, of Hannibal, Mo.: "I have suspended the use of the merc. jodat. and nitric acid, and he now takes *veronica* as recommended. This plan of proceeding is new to me, and I am pleased to add is so far *very* satisfactory in its results. I have no doubt but the cure will be *complete* in due time."

Lachesis.—Dr. Wesselhoeft* reports a case of constitutional syphilis cured by this remedy which was accompanied with rheumatic pains, nodules on the forearms, prostration, and bluish-black colored spots on the legs, etc.

In syphilitic cachexy the following accessory remedies are among the most appropriate, viz: *arsenicum*, *acid phosphor.*, *acidum nitricum*, *carbo veg.*, *china*, *kali hydriod.*, *iodium mercurius*, and *sulphur*.

In affections of the *testis*, which often denote a more advanced condition of the constitutional disease, attention must be given to the state of the vital powers, and the treatment will be directed accordingly. Most frequently one testis only is affected, and but very rarely both, the disease very commonly being accompanied by a small hydrocele, constituting a hydro-sarcocele. The affection increases gradually, giving rise to uneasiness from its size and weight, but is not followed by suppuration or other inconvenience. Another variety of this affection has been described by Mr. Hamilton, of Dublin, which he terms "tubercular syphilitic sarcocoele." In this disease the testis is enlarged to three or four times its natural size, is of an irregular shape, uneven, hard, and knotty, neither painful nor tender, but inconvenient from its weight, causing pains in the cord and loins. Both testes are usually affected, but one is worse than the other; and when disorganization is extensive, all sexual desire is lost, and neither erections nor emissions take place, both returning, however, as the treatment restores the organs to their normal condition. Unlike the former variety in this suppu-

* Clinical Observations on Lachesis, B. J. of Hom., vol. xxii, p. 491.

ration takes place, followed by the discharge of thin pus, with fistulous openings and occasionally the protrusion of a fungus. This form of sarcocele occurs in persons of a broken and cachectic constitution, who are suffering severely from the more advanced and inveterate forms of constitutional syphilis, especially of the bones and throat. The remedies most appropriate to this form of the disease, and which possess a marked influence on the affection, are *aurum*, *conium*, *clematis*, *iodium*, *mercurius*, *pulsatilla*, *phosphorus*, and *sulphur*. The remedy selected should be continued alone or in alternation until all hardness disappears. Any hydrocele that exists should be tapped and the fluid drawn off by means of a small trochar and canula before the medical treatment is begun. (*Vide* page 402, Epididymitis and its treatment.)

It is particularly important, in treating cases of constitutional syphilis, to attend to the *general* health of patients. "It is not sufficient," says Yeldham, "simply to give an infinitesimal dose of medicine, and say, 'Be thou clean.'" Collateral aid must be obtained from every agent calculated to improve and sustain the patient's constitutional powers. These cases are almost always developed in scrofulous constitutions; or if not, the diseases themselves have a tendency to depress the vital powers and induce all those feelings of languor and debility which have been described. To counteract this, to bring the system up to the finest standard of health and neutralize the effects of the venereal virus, the patient should be instructed to adopt all those means which are known to impart vigor to a depraved constitution; foremost among these are, a temperate yet generous and nutritious diet, cod-liver oil, friction of the skin, out-door exercise, and especially (when it can be obtained) country and sea-side air. Above all, the patient should be impressed with the absolute necessity of a steady and prolonged course of medical treatment. Nothing but this will bring about ultimate immunity from the ravages of the venereal poison.

CONGENITAL SYPHILIS.

Syphilis transmitted to the infant at the time of its conception, or communicated to it by the mother during the process of gestation, is termed *congenital* or *hereditary syphilis*; while *infantile syphilis* more properly includes those cases in which the child is

directly inoculated during or after delivery. In the latter instance, the phenomena exhibited correspond perfectly with the symptoms developed in the adult.

Etiology.—Congenital syphilis may be due to syphilitic infection of either one or both of the parents. It is not necessary, however, in order that the disease may be transmitted, that either the father or the mother should be laboring under symptoms of syphilis at the time of the conception of their offspring, as is proven from the circumstance that syphilitic children have been born to parents in whom the virus has remained dormant for years.

In case both parents are tainted with the poison of syphilis, the children will almost invariably be infected with the disease, whereas if only one is thus affected, the offspring may be born healthy, though the probability is that it will be more or less affected. Both parents, however, may be entirely free from the disease at the time of impregnation, yet the child, in consequence of the subsequent infection of the mother, may contract symptoms even as late as the fifth or perhaps the seventh month of gestation. The disease may also be communicated to the child by the father, while the mother may entirely escape contamination at the time of coitus, but may become subsequently infected through the foetal circulation.

It is a question of importance whether or not it is possible for a child affected with syphilis to communicate it to a healthy nurse. Though this question is disputed by many able writers, there still remains little doubt, from the cases reported by Hunter, Lawrence, Colles, and others, * that it may be thus transmitted; while it is unmistakable that wet-nurses frequently convey the disease to nurslings, by means of a chancre or secondary lesion on the breast. It is possible, also, that it may be conveyed through the medium of the milk, though sufficient testimony has not as yet been adduced to establish the truth of this supposition.

Abortion.—Provided the mother is not subjected to appropriate treatment in the early months of pregnancy, the great majority of cases will terminate in abortion; and especially will this result be likely to occur if both parents are affected with syphilis. The foetus often perishes as soon as the third, but most frequently about the sixth, month of gestation, the child being thrown off in a putrid,

* *Vide* Rankin's Retrospect, vol. iv.

offensive mass. A woman may, however, have a large number of successive abortions, and eventually give birth to a child having the appearance of health, being active, fat, and plump. In a few months there occur marked indications of disease; the child becomes emaciated, the skin presenting a dingy, yellowish, and shriveled appearance, and hanging in loose, soft folds; the face has an aged look, the countenance being wan, ghastly, and shrunken; the breathing is snuffling, in consequence of a congested condition of the mucous membrane of the nose. The throat is sore; the gums are found to be red and spongy; there are cracks or fissures about the mouth and anus; a copper-colored eruption, usually smooth and flat, covers the body, death often closing the scene in the course of a few weeks.

Period of Development.—Infants affected with congenital syphilis rarely present traces of their inherited taint until some time after birth; and in case the child passes a period of three months without manifesting any of the symptoms peculiar to the disease, there is little ground for apprehension; though the disease may remain undeveloped in the system as late as the age of puberty; and cases are recorded in which it was not aroused into activity before the subjects had attained forty years of age.*

It appears, however, from a table of 158 cases, prepared by Diday, that the great majority of syphilitic infants exhibit symptoms of their disease within three months after birth, which is corroborated by the testimony of other authors.

Symptoms.—Many of the symptoms of congenital syphilis correspond with the symptoms exhibited by adults laboring under the acquired form of the disease, and have already been described. There are, however, a few symptoms peculiar to subjects of hereditary infection which are worthy of brief notice.

General Aspect.—As a general rule, there is nothing peculiar in the general appearance of the infant immediately after birth; in the course of a few weeks, however, as the symptoms peculiar to the disease begin to manifest themselves, the child rapidly assumes a withered, shriveled, and emaciated aspect; the skin loses its freshness, becoming sallow, mottled, and dingy; the eyes and

* Ricord, discussion before the Académie Impériale de Med., session of October 8, 1853.

cheeks become sunken; the palms of the hands, soles of the feet, chest, and inside of the thighs, present a wrinkled or chapped appearance, or become the seat of characteristic copper-colored or reddish-brown eruption.

Coryza.—A thin, serous discharge from the nostrils is an early and very common manifestation of congenital syphilis, and sometimes exists for a considerable time unaccompanied by other symptoms. As the discharge continues, it gradually assumes a sanious, purulent character—mucous patches, fissures, and pustules appearing about the margin of the nostrils. The nasal passages soon become obstructed by the formation of scabs and the desiccation of matter, thus interfering with respiration, and often prevents the child from drawing sufficient nourishment from the mother to sustain it. The affection often extends to the throat and larynx.

Affections of the skin and mucous membranes.—The occurrence of *mucous patches* is perhaps the most frequent and prominent symptom of congenital syphilis. They may be developed upon the skin as well as upon the mucous membranes of infants, owing to the general moisture and delicacy of the former. Their favorite seat is upon the nates, scrotum, vulva, thighs, axillæ, and behind the ears. Ulceration frequently succeeds, giving rise to a very offensive and peculiar odor.

When seated upon the mucous surfaces, they are most commonly found upon the internal portion of the cheeks and lips, at the base of the gums, and upon the fauces.

Pemphigus, characterized by vesicles of considerable size, and filled with a yellowish fluid, frequently admixed with blood, is the only eruption developed before birth. It is generally seated upon the palms of the hands and soles of the feet. Its presence indicates an unfavorable prognosis.

Treatment.—The treatment of infantile syphilis is both *preventive* and *curative*. The *preventive* consists in treating the mother with the constitutional remedies heretofore recommended, as soon as her pregnancy is ascertained. Whenever *mercury* may seem to be the appropriate medicine to combat the constitutional virus, it should be administered by inunction rather than by the mouth. Should repeated miscarriages have occurred as the consequence of this constitutional taint, one or even both of the parents, if suspicion so direct, should undergo the necessary treatment; in

this way the recurrence of this accident may be prevented. The *curative* treatment as regards the infant is exceedingly simple and efficacious. The child should be taken from the mother's breast and be *brought up by hand*. The practice of procuring a nurse for syphilitic infants is greatly to be reprobated, as I once witnessed the most melancholy evidences of infection of the nurse in this manner, terminating in the entire breaking up of a once happy family. As soon as the disease is diagnosed, the child should be immediately put under the influence of one of the mercurial preparations, and none possess a more decidedly curative action than the *iodide of mercury*. "Indeed, the ready manner," says a distinguished author, "in which all disease may be eradicated from the system of a syphilitic child by this mineral, is perhaps one of the strongest proofs that can be adduced of the *specific* character of its action on the venereal poison." Sir B. Brodie recommends its use by the inunction method. I prefer altogether its internal use, from the sixth to the twelfth potency (decimal) twice a day, and to be continued until the *eruption* and *snuffling* have disappeared, when the *nitric acid* or *iodide of potash* may be given for another week or more. It will seldom be found necessary to repeat the mercurial course more than once, the symptoms disappearing entirely under the use of these remedies. Occasionally the cutaneous syphilodermata are complicated with and obscured by other skin diseases common to infantile life, the most frequent of which is eczema, impetigo, nodes of the head, face, and body. When this occurs, the diagnosis will be more or less obscured, but the history of the case, the concomitant cachexy and snuffling, the brownish appearance of the eczema and its squamous characteristics, will assist in determining the true nature of the disease. Whenever such complications exist, the surgeon will first treat the syphilitic affection; and when it is entirely eradicated, attention may be given to the remaining disease. If the little sufferer should be attacked with stomacace, or angina mercurialis, with or without a degeneration of the soft structures, *aurum*, preceded by *hepar sulph.* in the middle potencies, will prove efficient. If mercurial complications exist, *phytolacca*, or *nit. acid*, will answer the indications of treatment. If dysphagia accompanies the stomacace, with stiffness of the jaws, swollen, thickened, and spongy gums, *bell.*, *dulc.*, *phy.*, and *stil.*, should be resorted to. Caries of the nasal bones, with a cachectic

constitution, demands *aurum*; caries produced by mercury, peristitis, and cartilaginous thickening, *assafæt.*; suppurating ulcers and lymphatic indurations, *acid phos.*, *puls.*, *barytes*, *carbo. veg.*, and *silicea*; painful glandular swellings and mercurial pains, *cicuta*, *phy.*, and *corydal.*; exhaustion, want of appetite, restlessness, cold extremities, thirst, feeble pulse, sensitiveness to irritating causes, *china* and *ferrum*; profuse and obstinate night-sweats, *phosph. acid.*

Syphilization.—The method of inoculating a person with the syphilitic poison, to produce a constitutional state or diathesis in which the system is no longer susceptible to the action of the venereal poison, has been advocated by Turenne and Sperino, of Turin, it is contended, with considerable success. Professor Bœck, of Norway, says he has cured the “most inveterate cases of syphilis by subjecting the patient to a series of inoculations, at intervals of six, five, or three days, and permitting the chancres thus produced to run their usual course. This mode of inoculation consists in making several small punctures at one time on the arms and thighs with an inoculated lancet. These punctures become real indurated chancres in about five days; and before they have reached the stage of induration others may be initiated in the neighboring parts; and thus the process may be kept up until a complete immunity is attained, and when this point is reached all the old symptoms of syphilis gradually disappear. It is to be employed in curing those terrible cases of the disease in which all common measures would fail if tried, and in which extraordinary measures have proved worse than the original disease.”* This method requires additional and more well-attested evidences of its ability to cure “these terrible cases” before it receives the sanction of the profession as a mode of treating venereal diseases. Under the homœopathic system of treatment, if judiciously and perseveringly used, little or no difficulty is experienced in effecting a complete and decided cure.

*Marcy and Hunt's Homœopathic Practice of Medicine, vol. ii, p. 321.

SECTION VII.

SPERMATORRŒA.

This disease is characterized by an excessive secretion and frequent discharge of the seminal fluid, accompanied by marked evidences of nervous exhaustion.

Involuntary emissions, however, are not invariably to be regarded as the result of diseased action; it being no uncommon occurrence that healthy persons are subject to occasional discharges of semen without experiencing the least constitutional disturbance in consequence of their continuance. Thus, an individual of full habit, living upon a nourishing or somewhat stimulating diet, and having little exercise, will be likely to have more or less turgescence of the genital organs; and the vesiculæ seminales being full, a perfectly natural and healthy emission may occur from any slight cause, as a lascivious dream, or from the pressure of feces upon the organs lying in contact with the rectum. This fact should be strongly impressed upon the minds of persons thus affected, lest the tendency to mental depression, attending the appearance of any disease in the genitals, should be the means of ultimately establishing an actually diseased condition. Provided, however, the emissions occur more than two or three times per month, followed by more or less debility and mental despondency, and especially if there is reason to believe that masturbation is the cause, they should be looked upon as indicating a condition requiring immediate attention, as otherwise the most serious consequences will probably follow.

Etiology.—This affection may arise from any cause having a tendency to create an abnormal irritation of the genital organs, the most common of which are masturbation, excessive sexual intercourse, gonorrhœal lesions, presence of ascarides in the rectum, stone in the bladder, stricture of the urethra, prostatitis, and hæmorrhoids. Masturbation, however, is by far the most frequent and serious of all the causes producing this condition, and is often practiced at an extremely early age. The irritation occasioned by this unnatural excitement is at first confined to the neck of the bladder, the ejaculatory ducts, and the vesiculæ seminales, but soon extends to the spinal cord, whence it is communicated to the sympathetic

system, thus developing the whole train of mental and bodily phenomena characteristic of the disease.

The constitutional injury sustained is due rather to an absolute waste of vital power than to the actual loss of the seminal fluid, though the latter is undoubtedly a source of considerable exhaustion. This becomes the more evident from a consideration of the fact that an exercise of the sexual function produces the most intense nervous excitement; and hence it is in no wise remarkable that by unnaturally or too frequently provoking the sexual orgasm, the most serious consequences should follow.

Symptoms.—At the commencement of the disease, the emissions generally occur at night during the progress of a lascivious dream, and are attended by a pleasurable orgasm, awaking the patient. They are each followed by a corresponding sense of fatigue and mental depression. As the local irritation and general debility increase, the discharges become more frequent, occurring, with little or no sensation, as often as five or six times per week, or even two or three times in the course of the twenty-four hours. The seminal fluid is now secreted in preternatural quantity, and greatly changed in character, losing its visciduity, being thin and watery, with a characteristic strong odor. Impotence, more or less complete, results in protracted cases—more from want of confidence, as a general rule, than from actual loss of power, although the erections are liable to be imperfect, while the emission may occur too soon, or in some cases be too long deferred. Not unfrequently also there will be almost a constant dribbling of the prostatic fluid, or of a morbid secretion, which will be poured out in an increased quantity during an erection, or while the patient is under strong mental excitement. The constitutional phenomena exhibited are quite as varied as there are individual cases; still, they all evince the most unmistakable evidences of great nervous exhaustion, the consequent maladies—as dyspepsia, consumption, affections of the liver, marasmus, and insanity—often being attributed to some other cause.

Among the mental symptoms manifested by this disease, especially if occasioned by masturbation, is a general impairment of the mental faculties; there will be loss of memory, inability to concentrate the mind upon any particular subject, want of confidence, continual despondency and apprehensions of danger, while all appreciation of intellectual and moral pleasures seems wholly lost.

Conscious of his own defilement, the patient wears a look of shame and confusion, avoiding society, especially that of virtuous women, feeling none of that confidence and ennobling refinement securing the enjoyment of social relations. This condition of the mind will be accompanied by restlessness at night, a sense of exhaustion, particularly in the morning, with flashes of fever and loss of appetite. The digestive function becomes deranged, the bowels are constipated, the stomach irritable; the appetite is variable, being voracious or entirely lost; there is headache, with vertigo, trembling of the limbs, lameness of the back, with more or less pain in the lumbar region. The pulse is quick, sharp, and irritable, though it finally becomes slow and languid; the countenance is pale; there are dark or livid circles under the eyes, pimples upon the face, while the whole frame gradually becomes emaciated.

The effect upon the female is none the less marked, being attended by many of the symptoms named, together with more or less menstrual derangement, leucorrhœa, irritable uterus or prolapsus of this organ, chorea, and hysteria.

Pathology.—Nothing very satisfactory has been ascertained respecting the true pathology of this complaint, notwithstanding the most carefully and skillfully conducted autopsies have been repeatedly made. More or less irritation of the urethra and congestion of the spinal cord and cerebellum, together with inflammation of the vesiculæ seminales and prostate, have been observed, though these conditions are by no means confined to this disease, but are often found to supervene upon other causes.

Diagnosis.—The diagnosis is generally made without difficulty by closely observing the symptoms enumerated, and will often be confirmed by an acknowledgment of the patient respecting the true cause of the phenomena presented.

Prognosis.—Provided the disease be of recent origin, a favorable prognosis in ordinary cases may be confidently given, removal of the exciting cause often being sufficient to occasion a spontaneous cure. But in severe and protracted cases, owing to the mental condition of the patient and the shattered state of the nervous system generally, the prognosis must necessarily be guarded.

Treatment.—The moral treatment of a patient affected with this disease is not the least important part of the duty to be discharged by the surgeon. Hence, the first object should be to gain the entire

confidence of the patient, who is the victim of mental more than physical suffering. He must be freed from his wretched forebodings of the future, his utter hopelessness of recovery, and be fully assured that the drain upon his system occasioned by the discharges have little influence in retarding the cure compared with the aggravation produced by his continued depression of spirits. He must also be thoroughly disabused of the idea that he is fully posted on the subject of his affection from reading the numerous pamphlets circulated by those who profess to make a specialty of the disease. Having convinced him that he is the subject of mental or nervous derangement more than absolute local disease, he should be instructed *to abstain at once and entirely* from his vice, also from all sexual intercourse during the time of treatment. Let him receive the assurance that due perseverance will enable him wholly to overcome what seems to him an almost resistless and overwhelming propensity, soon making it appear to him as loathsome and disgusting as it is injurious. He should attempt to free his mind from all thoughts concerning his condition, indulging in no vulgar conversation, avoiding lewd females, reading no lascivious books, which will indirectly be the means of his cultivating a taste for good society and instructive reading.

Diet.—The diet of the patient is a consideration next in importance in the line of *general treatment*. The food should be plain, simple, but nutritious, and taken at regular intervals, avoiding all highly-seasoned and stimulating articles, as puddings, pies, tea, and coffee; also abstaining from late suppers.

Exercise.—Regular and pleasurable exercise, combined with healthful mental occupation, will be found a most valuable adjunct to the successful action of the remedies to be employed. It should, under no circumstances, however, be carried to exhaustion; but if moderately employed, will have a tendency to distribute the vital energies throughout the general system, instead of their being wholly expended through the sexual organs.

Sleep.—The patient should sleep upon a mattress, with light covering, and cultivate the habit of retiring early and rising as soon as he wakes in the morning; on no account should he allow himself to take the "second nap," as he will be especially liable to have an emission at this time. He should also avoid sleeping on the back—emissions occurring almost invariably while in this position.

Bathing.—The most beneficial effects may be expected to result from a properly-conducted system of bathing. So various, however, are the degrees of debility and susceptibility, together with the diversity of circumstances in which different patients are placed, that it is impossible to give directions which shall be of universal application. Provided, however, the patient be very restless during the fore part of the night, a *hand-bath*, followed by friction with the dry hand until an agreeable reaction is produced, may be administered immediately before retiring, which will have the effect to relieve, in a great measure, at least, the nervous excitement, and produce refreshing sleep. As a general rule, however, bathing in the morning upon rising will be preferable, and may be repeated three or four times per week. Too much of a shock to the system by dashing cold water freely on the surface is to be avoided, as well as chilling the body by continuing the bath too long. A bath should never be taken within one hour previous to eating, nor within three hours after. Tepid water should be used at first, especially in the case of delicate patients, the temperature being lowered as they become accustomed to it. The frequent erections will be very much relieved by dashing cold water on the perinæum, and should invariably be practiced by the patient when feeling an almost irresistible desire to indulge in his fascinating vice.

The *sitz-bath*, described on page 77, will be found a valuable auxiliary.

The *girdle*, to be employed in lameness of the small of the back, is made by folding a wet towel two or three times upon itself and confining it to the part by passing a long bandage, ten or twelve inches wide, several times around the body.

Injections.—Injections *per rectum* of tepid or cold water will relieve much of the irritation of the vesiculæ seminalis and prostate gland, and at the same time will have a tendency to remove the constipated condition of the bowels, and to prevent hæmorrhoids and prolapsus recti.

Porte-caustique.—This instrument, of various designs and arrangements, has been employed since the time of Ambrose Pare for cauterizing the urethra in cases of thickening of the canal dependent upon chronic inflammation of its structure. The original idea of Lallemand, following Pare, Hunter, and others, was the treatment of those chronic inflammations of the urethra resulting

in stricture, ulceration, and abscess. Its application to spermatorrhœa was an after consideration, and since then its utility has obtained diverse views, frequently producing the most serious consequences, and often failing to cure the disease. Messrs. Acton and Romberg are zealous advocates of the *porte-caustique*. Notwithstanding this, it has lost its hold upon the confidence of the profession, as it should have done long ago, and is now almost entirely abandoned.

Urethral injections and catheterism have also had special partisans to advance their claims to professional favor, but like the preceding, they, too, have yielded to a more rational and scientific mode of treating this affection.

Other instrumental methods.—Under this head I include all the various mechanical appliances to prevent involuntary seminal discharges. One of the most useful expedients of this kind is a leather ring armed with metallic points large enough to be worn without discomfort until erection occurs, when the pricking will arouse the patient. This instrument is beneficial in those persons who have decided erections and emissions with a distinct orgasm. Trousseau recommends the introduction of a ball into the rectum, large enough to compress the seminal ducts; and the operation of acupuncture, which consists in passing long needles into the prostate and vesiculæ seminales, is advocated by Lallemand, who regrets its having fallen into disuse. These last two processes are entirely too barbarous to be considered for one moment in the treatment of this affection.

The medicines which have been used with the greatest success include *eryngium aquaticum*, *aconite*, *nux vomica*, *phosphoric acid*, *ferrum*, *china*, and *lycopodium*.

Eryngium aquaticum.—This remedy exerts a marked influence over the genital organs, and, from a somewhat extensive experience, I am enabled to pronounce it a most effective agent in controlling involuntary emissions occasioned by onanism or excessive sexual intercourse. In ordinary cases, it should be administered as often as three times per day, at the second or third attenuation.

Aconite tincture will be found serviceable, in the early stages of the disease, in controlling the flashes of fever and cerebral congestion, and should be given in alternation with the above remedy.

Nux vomica should be exhibited in the case of persons of

sedentary habits, or who have indulged freely in stimulants, and are constipated or affected with hæmorrhoids. It will also have a tendency to remove the intense nervous excitement and numbness of the extremities.

Phosphoric acid.—This remedy is also serviceable in the cases of persons laboring under high nervous excitement, with tendency to impotence, the emissions occurring with partial erections.

Ferrum met. is applicable to cases in which the patient is weak and emaciated, or cachectic, the emissions being attended by firm and often painful erections; it may be used also in great weakness of the genital organs.

China will be found of service in cases of long standing, in which the emissions are frequent and profuse, the patient much debilitated, with great sensitiveness of the nervous system.

Lycopodium.—This remedy should be administered in those cases in which there is partial or complete loss of sexual desire, with flaccidity of the penis; and especially where there are obstinate constipation and flatulence, with general lassitude and tremor of the limbs.

Kali bromium, according to Pfeifer, has the power to diminish secretion in the muscles and organs of secretion. and is considered a sovereign remedy in anomalous erections and pollutions. It is an exceedingly certain and efficient agent in spermatorrhœa accompanied with the following symptoms: insomnia, great excitability, nervous and spasmodic affections of the throat, sexual excitement, and an irritable state of the sexual organs. It is especially curative in the epilepsy and chorea of spermatorrhœa. Dose, five to ten grains two or three times a day.

Digitalis.—There are few remedies that possess greater anaphrodisiac powers than digitalis, or rather *digitaline*, in the third trituration. A few doses will effect a marked improvement, if not a complete cure. It is better to give the remedy in the morning, for if administered at night, it is apt to interfere with sleep. The irritative weakness and relaxation that accompanies the affection is more difficult to relieve, and the remedies most suitable to overcome this are *solanum*, *acid. nitric.*, *agar. musc*; but when the weakness is so great as to threaten impotency, *agnus cast.*, *cannabis*, *capsicum*, *lycopod.*, will be found beneficial.

If spermatorrhœa be complicated with satyriasis, then *canth.* is the specific, especially when the cerebro-spinal system is affected.

For the functional derangements of the sexual organs, which frequently appear as a consequence of the affection, one of the following remedies may be applicable: *acid phos.*, *china*, *calc. carb.*, *nux vomica*.

*Cobaltum met.** is recommended by Prof. Lippe, of Philadelphia, as possessing great curative action in this affection. "I have cured," he says. "many cases with it—the worst cases of impotence, with or without spermatorrhœa, especially in consequence of suppressed gonorrhœa, by injections of the sulphate of zinc and one or two doses of cobalt, thirty."

Cimicifuga is indicated when there are present decided nervous phenomena as a complication.

Electro-magnetism is an agent of considerable repute in derangements of the sexual-spinal system, with almost complete loss of sexual functions, the ejaculations taking place without orgasm. It should be applied to the back and hips twice a day, and of five or ten minutes' duration. Palmer's voltaic battery I have found the best instrument for the purpose. In applying this method, whenever the *electric-nervous action has to be increased*, as in hypochondria and hysteria, general debility caused by onanism, involuntary emissions, sexual excesses, the *negative* pole should be applied to the back or occiput; and the *positive* to the arms, legs, or abdomen.

In *impotence*, the *negative* pole should be applied to the back, the *positive* to the perinæum.

In *local* or *general debility*, apply the *negative* pole to the back, the *positive* pole to the affected part.

In diseases which require a *diminution of electric action*, such as spasmodic diseases, the *negative* pole is applied to the affected part, and the *positive* to the back or occiput.

In *excessive sexual excitement*, *nymphomania*, *satyriasis*, the *negative* pole is applied to the hands, perinæum, or abdomen; and the *p. sitive* to the back or occiput.

Before retiring for the night, the urine should be voided and the organs bathed in cold water for one minute or longer, and allow the

* Philadelphia Jour. of Hom., vol. i, p. 449.

water to pass away by evaporation, rather than by friction with the towel. The bathing should be repeated upon rising in the morning. An emission is more likely to take place when the bladder is full, so that the patient should be instructed to rise during the night and pass his urine. Experience proves that emissions are much more prone to occur in the early morning; it is recommended, therefore, that patients be enjoined to rise early, and not take their morning nap. Feather beds should be interdicted, and the patient be compelled to lie upon a hard mattress, having the *covering as light as possible* summer and winter. Dr. T. G. Comstock, of St. Louis, says this valuable expedient was first suggested to him by Prof. Hyrtle, of Vienna, and he has had abundant opportunities of verifying the truth of the suggestion. "The patient should be compelled," he adds, "to lie upon his side; and to effect this, a large knotted handkerchief may be tied around the body, the knot corresponding with the spinal column. A suspensory bandage should be continually worn when the patient is going about; and in intractable cases a change of residence is highly beneficial." Dr. Comstock reports the beneficial results of introducing a metallic sound twice a week into the bladder and permitting it to remain for a few minutes each time.

Trousseau advises a mechanical treatment with the object of compressing the urethra at the orifice of the ejaculatory ducts. This is effected by introducing within the rectum an elongated and oval-formed pessary, varying in size from a pigeon's to a hen's egg, and connected by a stem with a metal plate applied to and resting upon the perinæum and coccyx. I have no faith in such processes, and believe the treatment recommended above infinitely superior to any mechanical treatment, and more certainly curative.

Marriage. — The practitioner is frequently desired to give an opinion as to the curative value of marriage; and as the answer embraces many points of exceeding great delicacy and difficulty, it has been deemed best to embody the opinion under the following rules, which seem to present the most reliable conclusions on this important question:

1. If spermatorrhœa exist in the spinal or cerebral form, marriage is improper.

2. Marriage is proper in the genital form if the marriage rite may be consummated, although imperfectly.

3. Marriage should never be recommended as a curative means.

There can be no doubt that judicious sexual intercourse will prove curative in the genital form of spermatorrhœa, provided that the reflex excitability of the cord be not so great as to prevent intromission of the male organ. Disappointment and unhappiness almost invariably result when marriage is resorted to as a remedy. "In the management of this affection," says a recent writer, "the personal conduct of the physician becomes an element of success or failure. These patients are shy, gloomy, and morbidly sensitive. They have been frequently sadly duped, and are entitled to the sympathy, considerate attention, and the inviolable confidence of the profession. When they make known to him their humiliating condition, their fears and unhappiness, he should not add to their distresses by abrupt and unfeeling treatment. That physician will be the most successful in the application of his therapeutic measures who is most largely gifted with discretion and humanity."

PART V.

MORBID GROWTHS OR TUMORS.

CHAPTER I.

GENERAL CHARACTERISTICS OF TUMORS.

Definition.—The word tumor (*tumeo*, I swell) is somewhat indefinite, it being customary to apply this term to “any preternatural eminence developed in any part of the body,” from whatever cause. By Hunter it was used to express “a circumscribed substance produced by disease, and different in its nature and consistence from surrounding parts;” by Miller, of Edinburgh, “to any morbid growth or new structure which is the result of perverted nutrition in a part, unconnected with inflammatory action otherwise than as an exciting cause;” Erichsen gives a definition similar to the latter, while Gross pronounces it “an enlargement of a part, structure, or organ, produced by abnormal deposit,” which is more concise than the above, and equally comprehensive.

Pathology.—The investigations of pathologists respecting the development of tumors have thus far resulted in a diversity of opinion. By later authorities they are regarded as consisting in a transformation of tissue, occasioned by an increase or multiplication by division of cells having a previous existence in the part abnormally enlarged; while others believe them to be a growth resulting from causes acting through the blood itself, in consequence of which a morbid product is thrown out, originating nucleated cells, by whose transformations all the various structures constituting tumors are produced.

Origin.—As regards their origin, however, it may be stated as a general law that all non-malignant tumors result from some derangement in the function of the primitive tissues, which may or may

not have been occasioned by local irritation. Many are nothing but local hypertrophies, or enlargements consequent upon inflammatory action, supermetrition, or perhaps the retention of some normal secretion. Malignant tumors, however, are always the result of an abnormal deposit, and generally differ from the natural structures in their physical, chemical, and vital properties. Hence, the peculiar *character* of a tumor may often be determined by the microscopic appearance of its cells, as in cancer, or by the "cell action" of the tissues in which it is formed; thus enchondroma is found in connection with cartilage; lipoma, or fatty growths, with adipose tissue; osteoma, or osseous tumors, in connection with bone.

The *situation* of tumors is exceedingly variable, there being scarcely a part of the body that is exempt from them. As a rule, it may be stated that the glandular organs suffer more frequently than others from malignant growths; benign, or non-malignant tumors, are more common in the skin, cellulo-adipose tissue, nose, uterus, and ovary; while hydatid formations are met with chiefly in the liver, breast, testicle, and bones.

In *volume*, tumors range from the size of a pin's head to that of the patient's body, examples of the latter occurring in ovarian cysts and elephantiasis. Cancerous deposits are comparatively small.

Classification of Tumors.—Owing to the great variety and variable character of tumors, no strictly scientific and accurate classification of them has been made by writers upon the subject. They have been designated as fleshy, fatty, pulpy, honey-like, etc., according to their sensible properties; and fatty, jelly-like, and albuminous, in view of their chemical nature, microscopical characters, and mode of development; while Rokitansky places all tumors of an ulterior fibrous constitution as comprehending all the classes referred to by other writers. Bennett, of Edinburgh, bases his classification on the compound texture of tumors, aided by their resemblance to certain pathological objects. It comprises nine varieties:

I. Fibrous	growths.....	Fibroma.
II. Fatty	"	Lipoma.
III. Cystic	"	Cystoma.
IV. Glandular	"	Adenoma.
V. Epithelial	"	Epithelioma.
VI. Vascular	"	Angionoma.
VII. Cartilaginous	"	Enchondroma.
VIII. Osseous	"	Osteoma.
IX. Cancerous	"	Carcinoma.

His subdivision is in accordance with the classification adopted by the old surgeons, in which the presence of particular substances, or their real or fancied resemblance to certain other substances, determines the name:

Hygroma.....	like Water.
Melanoma.....	“ Black pigment.
Chloroma.....	“ Green.
Hæmatoma.....	“ Blood.
Colloma.....	“ Glue.
Steatoma.....	“ Lard.
Artheroma.....	“ Gruel.
Meliceroma.....	“ Honey.
Cholesteatoma.....	“ Cholesterin.
Larcoma.....	“ Flesh.
Neuroma.....	“ Nerve.
Encephaloma.....	“ Brain.
Myeloma.....	“ Marrow.
Sherrhoma.....	“ Marble.

The terms Fibro-cystic, Fibro-sarcoma, Osteo-sarcoma, indicate the combination of two or more elements; while Fibroid, Cystoid, Adenoid, Chondroid, Osteoid, Colloid, Hæmatoid, Fungoid, Encephaloid, Myeloid, Cancroid, etc., indicate tumors that have a certain resemblance to, or partake largely of, the character and substance named, but which are not absolutely the same.* In view of the fact that some tumors have a marked tendency to degenerate rapidly and to affect the constitution, together with a disposition to reappear when extirpated, whereas others remain long unchanged, approximating simple hypertrophy of tissue, authors have been led to adopt another division, designating the former as *malignant*, and the latter as *non-malignant*, or *benign*. Though this classification is practically convenient, it is not well determined as scientifically exact; for, notwithstanding researches have shown that some tumors are uniformly and essentially malignant (as cancers), others invariably benign (as lipomas), still it is an unsettled question whether there is not a third class, which, under certain conditions, may not become converted one into the other.

Under the term *malignant* are included all abnormal formations which are capable of not only destroying the tissues in which they are deposited, but also the life of the patient. They are patholog-

* Bennett's Lectures, p. 150.

ically designated as heterologous, heteroclite, or heteromorphous, because of their usual dissimilarity to the natural structures. The growths comprised by this term are scirrhus, encephaloid, colloid, melanosis, etc., though the terms "cancerous" and "malignant" are not necessarily synonymous. Every cancer is to be regarded a malignant growth; still there are malignant tumors which do not possess the essential characters of cancer. Thus, Paget has fully described varieties of the fibro-plastic as well as of the fibrous and cartilaginous tumor, which, though preserving a uniform character throughout, microscopical and otherwise, have exhibited a marked disposition to return after removal, have destroyed the tissues by ulceration and sloughing, contaminating neighboring structures and even distant organs through the medium of the circulation, with death of the patient ultimately resulting. He also remarks, what has been observed by others, that in different persons and under different conditions the same disease may pursue a very different course, appearing in some as innocent, in others as of a malignant nature: as for example, children of cancerous parents may be the subjects of tumors apparently innocent in structure, but functionally malignant. But there is no convincing evidence that a benign or a malignant tumor of one type can under any circumstances be converted into a cancerous mass or a malignant growth of an entirely different type.

Though these various morbid formations differ widely in many respects, yet there are certain features possessed in common.

1. They are essentially constitutional from the first, or manifest a tendency rapidly to affect the constitution; and exhibit a disposition to return after extirpation, either in the original situation or at some other point.

2. They are less organizable than healthy lymph exudations, and hence incapable of maintaining a protracted existence.

3. They may occur in any of the organs or tissues of the body, at any age, in either sex, in all temperaments, under all circumstances, not unfrequently displaying an hereditary character.

4. They at first assume a concrete character, which, however, is soon lost, the disintegrating process being set up. The resulting ulcer is incapable of forming healthy matter or healthy granulations, the patient sinking rapidly under the influence of the local and constitutional irritation.

5. They generally occur without the existence of any assignable cause, are rapid in their course, exciting the same or a similar disease in the neighboring lymphatic glands.

The *non-malignant*, *innocent*, or *benign* tumors resemble more or less completely the natural structure of the part where they are developed, and are strictly local. They are slow in their growth, have little or no tendency to involve neighboring parts, and are usually inclosed in a cyst, being distinctly circumscribed. If left to the natural processes of nature, they often attain a great size, but seldom return after extirpation, whether large or small.

The treatment of tumors by extirpation has from time to time elicited much discussion, and surgeons of the present day are watching with much interest the accumulating testimony respecting the propriety of this procedure, especially in malignant formations.

It has not hitherto been generally regarded as sound practice to effect the removal of malignant growths, owing to the diseased action being disposed to reappear in or near the cicatrix; while it is also maintained that the irritation of adjacent parts occasioned by the operation hastens the death of the patient. Though somewhat lengthened statistics have been adduced in support of the latter statement, it is still doubted by the most worthy authority, such as Bennett, Virchow, Paget, and others. It is believed by them that the presence of the diseased mass is injurious by deranging the cell-action of the adjoining structures, ultimately impoverishing the nutrition of the body by the drain which it establishes, as well as by the mental and nervous irritation produced by the presence of the tumor. In 1853 Velpeau cited numerous examples of the successful extirpation of scirrhus, and even encephaloid formations, whose characters, microscopically and otherwise, were satisfactorily established, and in which ulceration had occurred, together with the implication of neighboring glands. It may, however, be regarded as very questionable whether, in the future researches of pathological science, it will ever be demonstrated that the peculiarity of cell-action or other conditions necessary to the development of malignant growths is such as to warrant the indiscriminate use of the knife, independent of the curative agency of constitutional remedies. The Homœopathic testimony respecting the efficacy of our remedies, aided by excision, in this class of

diseases, together with my own and the experience of others, is quite sufficient to authorize the statement that the most rational, and hence the most successful treatment of all malignant growths, consists in well-directed medication, assisted by an early and complete extirpation of the diseased mass.

Rules for Conducting Excision.—It is impossible to give other than the more general rules to be observed in the mode of operating in cases presenting so great a variety in size, form, situation, and character, as that which is seen in tumors. It is of paramount importance, however, in every instance where an operation is determined upon, that the most thorough and complete removal of the diseased growth be made; for it is possible that, if the most minute portion be retained in the wound, a reproduction of the abnormal deposit may supervene.

1. The knife should be held like a pen, and drawn with long, steady sweeps, making the first or second cut to reach the tumor itself, by which the danger is obviated of wandering into the sound tissue further than is desired.

2. The *straight* incision is particularly applicable to the removal of small and superficial tumors. The *elliptical* incision is employed where it is desirable to remove an excess of integument; though enough of the latter should always be preserved to afford a complete covering to the surface of the wound, at the same time being careful to preserve as much as possible of the subcutaneous cellulo-adipose tissue, in order to maintain the vitality of the skin.

The V incision is still more free, and is resorted to in the excision of tumors of moderate size, and in those so situated as to insure the safety of particular parts; while the *crucial*, or T, will be more appropriate in those of large size, requiring a free dissection. Pedunculated or pendulous tumors are best removed by making semi-circular, semi-lunar, or elliptical incisions; or by forming them in the shape of an L or a T, or, in rare cases, by making a crucial incision and turning back the flaps. The shape of the incision exerts a marked influence on the success of the operation.

3. Free use of the finger is to be made to ascertain the consistence of the surface of the wound, as the sense of touch is far more reliable than that of sight in cases of this kind. Muscles, vessels, glands, and nerves, must indiscriminately be sacrificed, that not a vestige of the suspicious product may remain.

4. In the commencement of an operation it is often required to pass a strong ligature through the tumor, in order to control it. This should be done immediately after incising the skin, especially in operating about the neck or in the region of important vessels.

5. When only a portion of an organ is involved, as the mammary gland, in cancer, it is to be removed entire; and in case the diseased action is of a malignant character, and is manifested in an extremity, amputation is advisable in preference to excision.

6. In the excision of malignant tumors especially, the loss of blood should be guarded against as much as possible. It is also of the first consequence that the sides of the wound should be neatly approximated, effort being made to secure union by the first intention. The dressing should consist of a light compress and bandage, aided by adhesive strips, sutures being used as sparingly as the nature of the wound will permit, in view of their being a source of additional irritation.

CHAPTER II.

NON-MALIGNANT OR INNOCENT TUMORS.

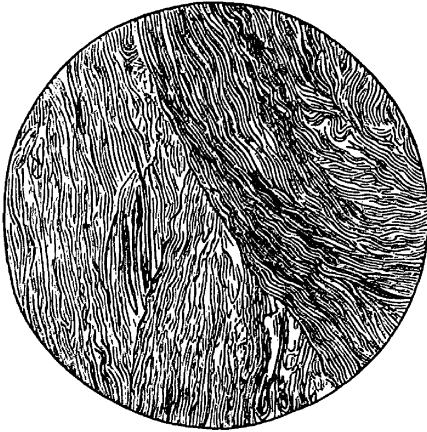
SECTION I.

FIBROUS TUMORS — FIBROMA.

Characteristics. — They are to be met with in various situations of the body, as in the testes and mamma; in the subcutaneous cellular tissue; in the periosteum; about the joints, and in the uterus, where they often attain their greatest magnitude; and in the antrum highmorianum, which is their most favorite locality. They are irregular in shape, are smooth, movable, and painless, their chief inconvenience resulting from their bulk, which is sometimes enormous, having been found to weigh as high as seventy pounds. They are composed of fibrous matter, as indicated by their

name, the filaments crossing each other in such a manner as to form an intricate net-work, Fig. 163, which is firm, dense, inelastic, and peculiar to this variety of tumor. They are reddish

Fig. 163.



Structure of Fibrous Tumor.

or purple, according to the amount of blood which they contain, occasionally presenting a silvery, glistening appearance. No reliable chemical examination has been made.

They may remain stationary for years, but are disposed eventually to undergo disintegration, becoming infiltrated and oedematous, breaking down into a semi-fluid mass, which passes on to suppuration, giving the part a malignant appearance.

In other cases again, they may degenerate into a spongy, calcareous mass, of a brownish color and hard consistence; but never undergo proper ossification. More rarely the interior of these growths softens and becomes absorbed so as occasionally to form cysts of large size, containing fluids of different shades of color. Paget relates the case of a very large cyst of this kind formed by the hollowing out of a fibrous tumor of the uterus, being twice tapped by mistake for ovarian dropsy.

Microscopical Character. — Microscopical examination exhibits nuclei and nucleated cells in immense numbers, which are of an oval, rounded, or spindle-shaped form. They may be very distinctly seen by previously treating the part with acetic acid.

§ 1. — Fibro-plastic Tumors.

This variety of tumors is met with in certain pendulous growths of the ear, in elephantiasis, and in what are denominated *keloid* formations of the skin. They were first described by Labert, and afterward investigated by Paget. They commonly occur in young

or middle-aged persons, are painless, and originate without any known cause, and are usually more rapid in their course than the purely fibrous growth. The name is indicative of their peculiar composition, which consists essentially of plastic matter, the development being effected from nucleated blastema, in the same manner as in ordinary lymph-growth.

In the great majority of cases they may be removed without the prospect of recurrence; though Labert relates six cases of this disease in which recurrence took place, with secondary deposits in internal organs. They are also capable, like other fibrous growths, of taking on malignant action, there even being a deposit of carcinomatous matter in their tissues. In this case, however, it is probable that the cancerous mass is an entirely new formation, governed by the same laws that influence the development of cancer in the normal structures.

§ 2.—Recurring Fibroid Tumors.

The marked characteristic of this class of tumors is their tendency to reappear after extirpation. Their favorite seat is about the face, a very common site being the superior maxillary sinus. In texture they are lobulated, soft, and even brittle, and are easily torn into fragments. Their color varies from a drab or light gray to white or pale yellowish. In external character they so closely resemble the properties of adipose tissue that they might easily be mistaken for a fatty substance. The malignant tendency of this class of tumors is not exhibited in many instances without the interference of some well-defined constitutional or local disturbance, when they at once become exceedingly rapid and destructive. Paget remarks that the malignant tendencies of these growths seem to be increased by repeated excision, becoming more painful, rapidly degenerating, and giving rise to an ulcerating fungus, which eventually proves fatal by exhaustion and hemorrhage. Neligan, however, reports a case in which, after three removals, no further recurrence of the disease took place.

Treatment.—The treatment of fibrous tumors consists in relieving the patient by means of operative interference; the tumor once thoroughly removed, seldom recurs. As regards the recurring fibroid, it

may be stated that it possesses no anatomical peculiarity by which it can be distinguished from the ordinary innocent variety. The discussion of these bodies by medicines internally administered has of late occupied the attention of the homœopathic profession; but, with the exception of an *occasional* cure, no great amount of benefit has as yet resulted from their treatment. The remedies spoken of as possessing more or less efficacy in this direction are *silicea*, *baryta carb.*, *kali hyd.*, *iodine*, *mercurius*, *lycopod.*, and *sulphur*. Dr. Bowers recommends the use of *belladonna* for a painful, indurated tumor in the mamma; the *bell.* was used both internally and externally, and the case progressed favorably—pain, tenderness, and swelling subsiding; and after a few months the patient felt quite well.

Graphites and *ledum* are said to possess the power of discussing tumors or morbid growths; but the indications for such remedies are so indistinct, and the cures effected so rare, that it may be truly said this whole subject is yet too little understood to permit anything like accuracy of result or certainty of detail. It is here that our homœopathic remedies fail to accomplish the great amount of good that obtains under other circumstances; yet I believe the time will come when all these morbid growths will find their similitum and consequent cure as precisely fixed by homœopathic therapeutics as are at present the most tractable maladies.

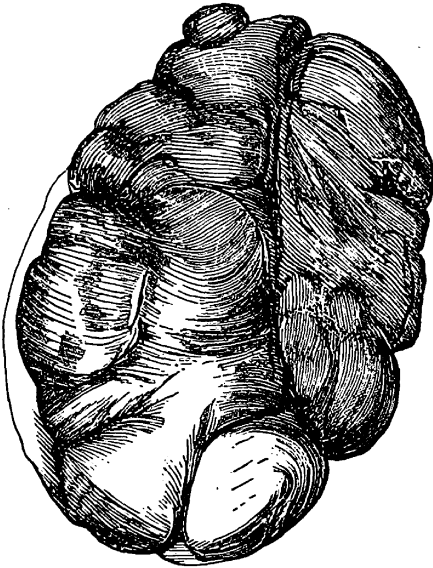
SECTION II.

FATTY TUMORS—LIPOMA.

Characteristics.—Fatty tumors are met with quite extensively in almost every part of the body, being more frequently located about the back, shoulder, and neck, than in any other region. They occasionally form in the internal cavities of the body, as in the omentum and mesentery, and about the kidneys. They generally occur singly, though they may be found in large numbers on the same individual. Thus, Gross relates the case of a medical gentleman upon whom he counted upward of two hundred, from the volume of a small pea up to that of a large marble. They appear as soft, indolent, inelastic, and doughy swellings, growing very slowly; sometimes oval, at

others round, and not unfrequently lobulated, as is seen in Fig. 164. A curious circumstance connected with these tumors is that they occasionally shift their seats, slowly gliding for some distance from the original spot on which they grew: thus, Paget relates cases in which fatty tumors shifted their position from the groin to the perinæum or the thigh. They often attain a large size, and in

consequence occasion much inconvenience by their bulk, rarely ulcerate or inflame, or undergo any ulterior change of structure. Dr. Bray, of Evansville, Ind., some years ago extirpated a tumor of this variety which weighed nearly forty pounds, the patient making a good recovery. Fatty tumors are always invested with a capsule which connects them with the surrounding structures, and through which they obtain their vessels, nerves, and absorbents. As this capsule is simply the result of a condensation of

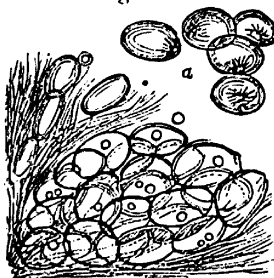


Fatty tumor.

the circumjacent cellular tissue, and not produced by inflammatory action, it varies much in different cases and under different circumstances. Attached to its inner surface are numerous processes, delicate in structure, which dip into the interior of the morbid growth, separating it into lobes, lobules, and granules. These tumors receive a small quantity of blood from the system, and hence bleed very sparingly when they are removed. It is only when they grow rapidly and are of large size that they are likely to become vascular. As these swellings are always free from pain, and are tolerant of rude manipulation, it is inferred that their nervous power, like their vascular, is exceedingly low.

Microscopical Character.—The minute structure of this variety of tumors is composed of cells similar to those of natural fat,

Fig. 165.



Minute structure of a fatty tumor.

interspersed through areolar tissue, as is represented in Fig. 165, the letter *a* representing isolated cells, showing the crystal-line nucleus of margaric acid. In *old*, fatty growths, various other substances of an adventitious character are present, in the form of granules, molecules, and globules. It is upon these *accidental* formations that pathologists have made certain subdivisions of this tumor, which, while they are of doubtful histological propriety, are of no practical importance to the surgeon.

Treatment.—The medical treatment of this class of morbid growths is not altogether satisfactory, for there are no remedies upon which we can confidently rely capable either of arresting its progress or effecting its removal. If the reverse occasionally happens, the instances are entirely too rare to invest it with anything like certainty of result.

Extirpation is generally the only successful treatment. Gross relates a case in which the tumor had become inflamed, and even passed on to ulceration, the ulcer having a remarkably foul and unhealthy aspect, with thin, everted edges; the pain was at times quite severe, the discharge of a sanious character, intermixed with globules of fat. All efforts to heal it proved fruitless. Extirpation was resorted to, and a complete recovery resulted.

Geyrard,* of Paris, reports two cases of steatomatous tumors cured in about a month with *thuya*, fifteenth. *Arnica tincture*, externally applied, aided by *compression*, has proved successful. *Baryta carb.*, *hovia*, *causticum*, and *silicea*, are recommended, though clinical experience is quite limited as regards their adaptability to cure these abnormal growths. Sir B. Brodie recommends *liquor potassæ*, under the use of which remedy he says fatty tumors have occasionally disappeared.

Baryta is reported as having removed the pain and arrested the growth of a steatomatous tumor in the neck; also of the axilla.

Baptisia is homœopathic to irritation of the glandular system,

* British Journal of Homœopathy, vol. xxiii, p. 139.

and has, in consequence of this action, a specific relation to glandular enlargements. It has been recommended as having removed fatty tumors of the breast and neck.

Galium aperinum is recommended as having cured a hard, nodular tumor of the tongue, after various expedients had been employed to dissipate it.

Causticum has removed sarcomatous tumors, causing them to inflame, suppurate, and finally heal.

*Phytolacca dec.** has been found "useful in encysted tumors, in recent indurations, and even in scirrhus of the breast." Dr. Eaden, of England, cured a tumefied mamma, as hard as a stone and extremely painful, in two days. "In ordinary caked breasts," says the same writer, "it is almost a specific."

Stillingia syl. is another remedy of considerable repute for the cure of lymphatic enlargements, fatty tumors, etc., and is said to have produced most excellent cures in this direction.

Silicea I regard as one of the most reliable remedies for removal of fatty and lymphatic tumors, and several cures are reported by various writers from the use of this agent.

Crocus.—Prof. Morgan, of Philadelphia, says a fatty tumor of the scalp was much diminished by *crocus* (1000). The *key-note* in the case was hemorrhage of dark blood, with stringy clots, and a feeling as if there was some living thing moving within it.

SECTION III.

CYSTIC TUMORS — CYSTOMA.

Characteristics.—Cystic tumors are very simple in their character, consisting of a sac or capsule of condensed areolar tissue, occupied by the most diverse fluid, or a combination of fluid and solid matter. They are produced by the gradual accumulation of a natural secretion in a previously-existing duct or cyst, with dilatation and hypertrophy of its walls, and are met with in three forms: 1st. As encysted tumors of the skin, mucous membrane, and subjacent cellular tissue, and dependent on the closure of the mucous follicles, as in one variety of **polypi**, or in obstruction of the excretory ducts of

* Hale's New Remedies—Phytolacca.

the sebaceous glands, producing the various **atheromatous** tumors; 2d. As formed by the closure and dilatation of other glands and organs, as in the sublingual or mammary glands, occasioning **ranula** or **milk** tumor; and 3d. Those formed by the retention and modification of the secretions in cysts without excretory ducts, as in synovial **bursæ**. Others, again, result from a new formation of a closed sac in the cellular tissue of the part, and the distention of it by an abnormal secretion from its lining membrane, as in simple and multilocular cysts. They may occur in almost any of the normal tissues of the body, but are particularly frequent in certain regions, as in the ovary, the thyroid and mammary glands, the kidney, the liver, the testicle, and in the skin and mucous membranes. They may also occur in abnormal growths, being occasionally met with in fibro-plastic, fibrous, and cartilaginous tumors, and even in cancer. When found imbedded in the latter, the cancer is designated as **Cysto-Carcinoma**; and when the cysts are numerous, containing a jelly-like substance, the cancer is termed **Colloid**. Innocent tumors containing cysts are known as **Cysto-Sarcoma**.

A cyst is said to be *proliferous*, *multilocular*, or compound, when it contains a number of compartments or cavities. This arrangement is accomplished by the existence of membranous processes which adhere to the inner wall of the parent cyst, and from which they branch out so as to intersect each other in different directions. A very peculiar circumstance connected with them is the fact of their containing different products; one perhaps a serous fluid, another a jelly-like substance, another blood, and still another a solid material. The *pilocystic* tumors are those containing hair and fatty matters. These would in many instances appear to be the remains of a blighted ovum inclosed in the body, as they are congenital and usually contain some foetal debris, such as portions of bone, teeth, etc. The fatty matter which they contain in large quantity, and which may be either solid or perfectly fluid, is, in all probability, the result of fatty degeneration of the soft tissues of which they are composed.

§ 1. — Sebaceous Cysts

Are formed in consequence of the closure of the duct of one of the sebaceous follicles; the natural secretion of the part continuing to

be thrown out, the sac becomes gradually distended to a very considerable size; and the fibrous layer of the follicle undergoing at the same time a process of hypertrophy, constitutes a firm wall. The accompanying Fig., 166, is illustrative of the appearance of the sebaceous cyst.

Characteristics.—They occur more frequently on the scalp, though they may be situated on the face, neck, back, or indeed on any part of the body. When any considerable size is attained, they are apt to become pedunculated. They are round, smooth, movable, either semi-fluctuating or elastic, though occasionally solid to

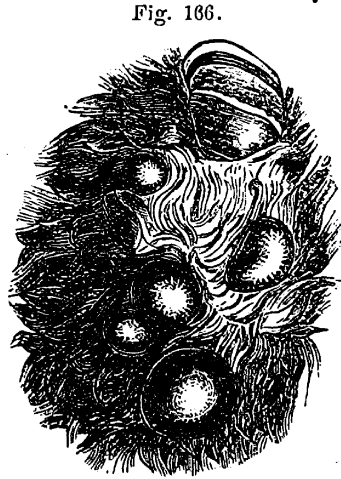


Fig. 166.
Sebaceous tumors of the scalp. a. A tumor laid open to show its cyst and contents.

the touch. The hair follicles become atrophied, and hence they are usually devoid of hair. Adults are more liable to be affected with them than children. They may be single or multiple, and generally increase very slowly; but not infrequently, after remaining stationary for years, they suddenly take on a rapid growth. The tumor itself is painless, but may occasion pain by its pressure upon the neighboring nerves. This variety is commonly known as **wen**. In another variety it sometimes happens that the sebaceous matter exuding through an aperture on its surface forms a kind of scab or crust, which becomes pushed up from below, assuming a conical shape, and styled a "horn" (see Fig. 167, page 578). In other cases, these tumors may inflame and suppurate; they can, however, be readily distinguished from malignant growths by a microscopical examination of their exudation or debris—these consisting of pus and epithelium mixed with fatty matters more or less disintegrated.

Diagnosis.—They are to be distinguished from abscess by their history, slow growth, situation, elasticity, and mobility, and the existence of the dilated orifice of the sebaceous duct through which some of the contents can be squeezed, the microscopical character of which will serve to confirm the diagnosis; from a fatty tumor, by the thin appearance of the skin over their surface, by their firm

and more regular feel, and by their tendency to become pedunculated, whereas in fatty tumors the base is broad.

Fig. 167.



Horny excrescence growing from the scalp.

of these morbid growths except by surgical interference; though, according to the observations of a few writers, cures have been effected by *calc. c.*, *silicea*, *phosph.*, *lyc.*, *merc.*, and *sulph.*, but they are too few and unreliable to command the confidence of surgeons as to their general curative value.

Treatment. — Extirpation is to be performed, which, if thorough, is never followed by a return of the disease. It is sometimes, however, considered preferable to treat them by enucleation, which consists in slitting them open and squeezing out their contents to permit the cyst to collapse; then by traction, or by dissection if the sac be firmly adherent, withdraw the capsule or cyst. It is important that the removal be complete, as it is proven by experience that if only a small portion of the sac be left, it will constitute a nucleus for the formation of a subsequent tumor. It is lamentably true that no certain means have yet been discovered to get rid

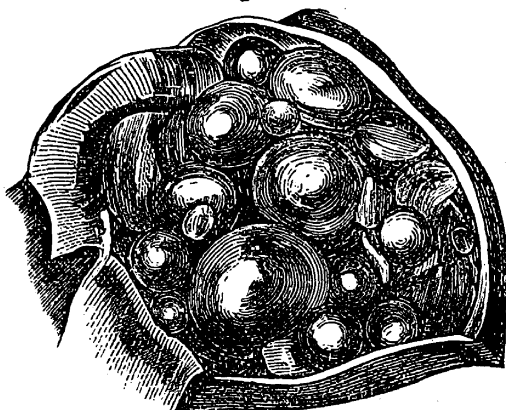
§ 2.—Hydatic Tumors

Are a form of morbid growth, consisting of the development of a cyst, inclosing a vesicular worm or parasite called a "hydatid."

There are several varieties of these entozoa, the most important of which is the *acephalocyst*, which commonly infests the liver (Fig. 168), ovary, and uterus, though they are occasionally met with in other parts, as in the testicle, mamma, bones and serous cavities.

The cyst itself is of plastic material, more or less vascular, and quite strong, containing within a soft, pulpy substance, in which is found the parasite. The contents of the worm itself are a clear, limpid fluid, saline, odorless, and incoagulable. They are short-lived, perishing in the course of a few years,

Fig. 168.



Hydatids inclosed in a common cyst.

either from suppuration, gangrene, or from the gradual disappearance of their contents. The danger to be apprehended from their presence is the inflammatory action likely to result; thus hydatid of the liver will sometimes induce fatal peritonitis, and so persistent are they in their course that even osseous structures are seriously affected by their progress. There are no signs by which their existence can be positively determined.

Treatment. — Operative interference is the only permanent and certain means of affording relief, whenever it can be safely performed. Before resorting to this procedure, if time is deemed of not much importance to the patient, recourse may be had to either of the following medicines: *Apis mel.*, *bell.*, *calc. carb.*, *graph.*, *mercurius*, *phosph. acid.*, *silicea*, *lycopod.*, *iodine*, *kali bichrom.*, *ledum*, and *sulphur*. The remedy selected should be in accordance with existing symptoms, taking into consideration any constitutional peculiarities that may exist during treatment.

§ 3. — Polypoid Tumors.

Polypi are pendulous tumors growing from any mucous surface, as from the nose, throat, uterus, and rectum. They occur more fre-

quently in middle-aged and elderly persons than in youth, presenting themselves in a variety of form and size.

The *mucous* or *gelatinoid polyp* is composed of the elements of this membrane expanded and spread out, and consists of a loose fibrous stroma covered by epithelium more or less distinctly ciliated. It may occur singly or in clusters, often attaining sufficient bulk to close completely the cavity in which it is seated. This variety is disposed to return after extirpation.

The *fibrous polyp* is of a dense, firm texture, and of a reddish, purple, or livid color. It grows rapidly as a general rule, and may produce, by its size and consequent pressure, serious mischief, together with frightful disfigurement. Its removal is usually attended by copious hemorrhage. It has also a marked tendency to return after extirpation, and in some instances has manifested malignant action.

The *granular* polyp has the character of its structure indicated in the name. It is less common than the varieties referred to, and seldom attains any very considerable bulk. It is found chiefly in the nasal fossa and in the uterus, is of a pale rose color, grayish or whitish, assumes a conical shape, and is usually connected by a long slender pedicle. It is easily detached by torsion, but may return after removal.

The *vascular* polyp is found in the nose, ear, uterus, and rectum, is of a florid color, spongy in consistence, and is likely to induce profuse bleeding upon being wounded. It is generally small, grows slowly, and seldom recurs after removal.

Treatment.—In the earlier stages of this affection much can often be accomplished by the use of internal remedies. Those which have been found the most efficacious are *calcareo carb.*, *phosph.*, *sulphur*, *silicea*, *teucrium*, *kali bichrom.*, *staphisagria*, *merc. jodatus*, *sepia*, and *pulsatilla*.* Provided the medicines do not effect a cure, removal by torsion, ligature, or excision, is to be resorted to as the only means of obtaining temporary or permanent relief. And in these cases, as in other varieties of tumor, it is essential that the entire growth be separated to avoid repullulation,

* Several cases of polypi nasi are reported as cured by the use of *calc. carb.*, *teucrium*, and *sulphur*. See Brit. Jour. Hom., vol. viii, p. 293, and vol. x, p. 484.

which will almost invariably be the result if this precaution is neglected. This subject will be treated of more fully in that part of this treatise which refers to Operative Surgery.

SECTION IV.

GLANDULAR TUMORS—ADENOMA.

The term **Adenoma** may be used to include a class of tumors differing in no essential particular in their structure from the normal tissue of the part in which they are situated. They are usually a hypertrophy of gland texture. The chronic disorder resulting in a condition of the thyroid gland designated as bronchocele, or goitre, forms an example of this type of tumor. There is often no sign whatever of inflammatory action, though in some cases inflammation seems to be occasioned by the enlargements. On examination, the structure of the gland will be found to have undergone an imperfect and ill-developed hypertrophy in some of its lobules, or to be expanded and infiltrated with plastic matter, the consequence of chronic inflammation; or else to have undergone tuberculous deposition when occurring in strumous subjects.

These tumors vary somewhat in appearance and course when situated in different glands of the body. Generally adenoma of the mamma are small; in other cases, they attain an enormous size, exceeding many times the bulk of the natural one. In some cases they are entirely painless, while in others they produce the most intense suffering.

Adenoma affecting the lymphatic glands may generally be traced to the local irritation induced by neighboring ulcers and morbid growths of various kinds; though in cancerous and scrofulous deposits creating tumors, it is not to be supposed that the enlargement of the glands in their vicinity necessarily results from a similar deposit.

Treatment.—The treatment of glandular tumors depends in a great degree upon the seat of the disease and the nature of the organ inflamed; thus, if they proceed from the abuse of mercury, *nitric acid*, *argentum mur.*, *phytolacca*, and *kali hydriod.*, will be found efficacious. The most appropriate remedies are *belladonna*, *calc. carb.*, *mercurius jodatus*, *phosphorus*, *rhus*

tox., *silicea*, *barytes mur.*, *carbo-animal*, *conium mac.*, *bryonia*, *pulsatilla*, *sulphur*, *zincum*, *iodium*, *spongia*, *graphites*, *plumbum*, *lycopodium*, *platina chlor.*, *aurum mur.*, *bromium*, *arsenicum*.

The proper remedy will be selected according to its similitum, and given until an impression, if possible, is made upon the diseased organism; then either suspended for a time, or substituted for another, according to circumstances. It is not the aim of the author, in this connection, to give a description of the great variety of glandular enlargements that occur in the human organism, and the remedies applicable thereto; in a subsequent part of this treatise they will be taken up separately, and treatment advised in reference to the position they occupy in the various regions of the body. If internal treatment fails in effecting a cure, *extirpation* is the only reliable method left to the surgeon, which should be done thoroughly and effectually. Their removal may be effected by *excision*, *ligature*, or *caustics*, according to their size, situation, and attachments. Of these processes, *excision* is usually preferable when they are situated on mucous surfaces; the *ligature* should be used if they are large and pendulous; and *caustics* may be employed when they are seated on the skin or a muco-cutaneous surface. These different processes will be pointed out more particularly hereafter.

SECTION V.

EPITHELIAL TUMORS — EPITHELIOMA.

Epithelial tumors consist of an increased deposit of laminated cuticle, usually with some augmented vascularity of the cutis. They exist with especial frequency in the mucous, the muco-cutaneous, and the more perspirable surfaces; thus the prepuce, the vagina, the axilla, and the cleft of the nates, are their favorite situations. When occurring on the skin as a result of local irritation produced by pressure or friction, they constitute a hard and horny excrescence known as **Corns**; when the cells constituting them are disposed to a papillary arrangement, being somewhat moist, they form *soft corns*.

When increased action consequent on local congestion gives rise to an accumulation of epidermic cells, there results a form

of skin disease styled the *Squamæ* or scaly class. *Condylomata* and venereal warts are analogous, being usually found where the skin and mucous tissues blend; they are, however, sometimes developed in consequence of some constitutional affection, as secondary syphilis.

Common skin **Warts**, frequently seen on the hands, especially of children, are of this class of epithelioma, being composed of epidermic cells arranged in a papillary form.

Closely allied to some of these warty structures is a peculiar, pinkish-white, fibro-vascular tissue, which is occasionally met with in old cicatrices as an outgrowth of these, and not unfrequently recurs after removal; it is termed **Cheloid**.

Any of these tumors may undergo fatty degeneration, softening, and ulceration, creating ichorous and irritating discharges; sympathetic irritation of the glands of the axilla or groin may result in consequence.

Various arguments have been adduced *pro* and *con* respecting the identity of epithelioma and cancer—Paget, Velpeau, and Schuh, regarding it as cancer; while Labert, Hannover, Bennett, and Lawrence, deny its cancerous nature. There seems, however, to be little doubt that epithelioma, under certain circumstances, may assume the peculiar character of cancer, while it is also equally evident that the properties of epithelioma are not always cancerous in their nature.

Microscopical examination shows: First, the epidermic layer to be composed of epithelium, arranged in concentric layers around and between the papillæ. Second, the papillæ and dermis are composed of white, intermingled with yellow fibrous tissue, everywhere abundantly infiltrated with epithelial cells, and with their nuclei and fibro-plastic matter. In the papillæ the epithelium is seen to be arranged symmetrically in concentric layers among the scanty fibrous elements, and this arrangement may penetrate to some depth within the cutis, from which elongated and imbricated rolls of epithelium, somewhat resembling the heads of young asparagus, can be extricated. Third, within the cutis and subjacent tissue, the epithelium is found sometimes in concentric pellets, like the *comedones* or *grubs*, or inspissated contents of sebaceous follicles; sometimes in rings formed within obstructed ducts or follicles; but usually in large, irregular quantities, infiltrated among the fibers of

the cutis and of the sub-cutaneous areolar tissue. It is distinguished from carcinoma by the following differential diagnosis: -

Ulcerative epithelioma has a warty origin.

In epithelioma, the *epithelial cell* abounds with large, flattened, and often folded walls, with nuclei *much smaller* than those of cancer.

In epithelioma, the nuclei of the epithelial cell do not grow with the cell.

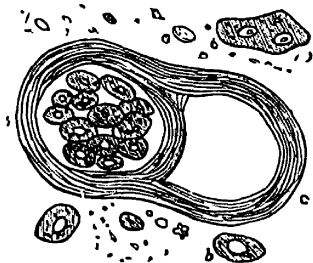
Epithelial tumors yield no juice.

The liquid *squeezed* from epithelioma does not mix uniformly with water, but runs into clotty or leafy masses with clear water in the interstices.

Ulcerated epithelioma may be diagnosed by the microscope, because epithelium is less destructible than the cancer cell, and more likely to come off in coherent masses.

Fig. 169 represents papillæ taken from an epithelioma, magnified 250 diameters.

Fig. 169.



a. Cyst inclosing small cells; b. Large, rather round cells; c. Empty cyst. (From a drawing by Dr. Da Costa.)

Ulcerated cancer begins by hypertrophy of the cutaneous papillæ.

In cancer, there will be found the *cancer cells*, or, if not, a number of cancer nuclei, with one to three nucleoli.

In cancer, the nuclei grow with the cell.

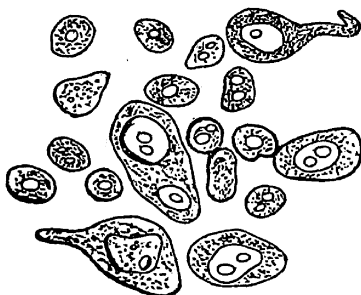
Cancer yields a peculiar juice in abundance.

Cancer juice mingles uniformly with water.

The cancer cell perishes readily on an ulcerating surface, and could not be distinguished from the pus and ichor present.

Fig. 170 shows the cancer cells as they appear in that disease.

Fig. 170.



Cancer cells.

Epithelioma generally begins from an innocent wart that has been in a state of quiescence for months or years. When ulceration begins, its course is constantly progressive. The skin and subcutaneous tissues are involved in the degeneration, and become hardened and adherent. The neighboring ganglia enlarge and take on similar morbid properties, involving muscle, bone, and all the adja-

cent structures. At the same time the surface undergoes foul and extensive ulceration, cracking open and emitting a thickish discharge, which soon dries into a scab. When this is detached, a wide ulcer is brought into view, with a deep, irregular excavation in the center, exuding a thin ichor, surrounded by fungous, warty growths, and resting on a base of hard, adherent, and infiltrated skin. Thus the entire lower lip may be destroyed; or the bladder, rectum, and vagina, may be converted into one huge cloaca. The constitution, at first sound and vigorous, soon succumbs to its ravages, and presents a cachectic and haggard appearance.

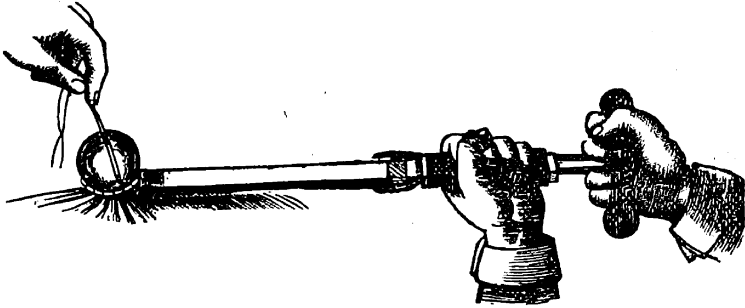
Causes.—Men are more liable to this disease than women; it generally makes its appearance after the age of forty. Constantly repeated local irritation seems to favor its production. Epithelioma of the lip is attributed to the smoking of short pipes. When it occurs within the prepuce, it is traced to the previous existence of phymosis. When it appears upon the trunk or limbs, it by preference occupies the site of some old scar or ulcer. The existence of a simple wart or mole seems to act as a predisposing cause; hence it is recommended to preserve such parts carefully from friction or irritation. The frequency of the so-called “chimney-sweeper’s cancer” in England, and the liability to warty excrescences and to epithelioma, is not only remarkable, but suggestive of the treatment to be pursued under the law of similars.

The parts most frequently affected are the *lower* lip, tongue, penis, vulva, scrotum, the back of the hand or foot, the internal organs, the larynx, bladder, and os uteri. It is liable to return after excision, especially if the whole diseased mass is not taken out, and is more quickly fatal when seated on the lip, tongue, or penis, than when it occupies other external parts of the body. In the tendency of epithelioma to spread and affect neighboring tissues, to return after excision, it bears a close resemblance to cancer, but is distinguished from it by being more capable of excitability from external causes; is not so early attended with constitutional cachexy; is more curable by excision; is homologous in its elements, and not liable to be diffused over distant organs.

Treatment.—The general and local treatment is the same as that for cancer, to which the student is referred. The surgical treatment consists in an early and free extirpation by the knife, followed by repeated and wide excision of any part within the sphere of the

malady, if it returns; or by destruction with the caustic preparations recommended under the head of Cancer. When the tumor is so situated that it can not be reached by the knife, or incision is deemed hazardous on account of hemorrhage, or from the impossibility of effectually extirpating the disease, recourse may be had to strangulation by ligature or the "ecraseur," or both, as represented in Fig. 171. In applying the instrument, it is often necessary first

Fig. 171.



The ecraseur in situ.

to insulate and raise the tumor from the surface by means of a ligature tied tightly around its base, and proceed with the excision as represented in the cut. It should be detached slowly, turning the lever every ten or twelve seconds until the mass is removed. The resulting wound is small, puckered in, and often heals with little trouble. If the disease can be traced to a syphilitic origin, the remedies recommended for that disease will be serviceable; if mercurial poison underlies the affection, then it should be treated with especial reference to that condition of the system.

SECTION VI.

VASCULAR TUMORS — ANGIOMA.

Vascular tumors consist of a net-work of small blood-vessels, connected by areolar tissue. They are of various size, from that of a mustard-seed to that of an orange, and of various colors, the latter ranging from a deep-rose to scarlet or purple. They are usually congenital, or make their appearance soon after birth, their favorite situation being the face and mucous membranes. Those

seated in the skin are denominated *Nævi Materni*, or “mother’s-mark.” These affections will be more fully treated in the chapter on Diseases of the Vascular System.

SECTION VII.

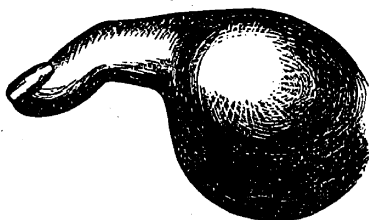
CARTILAGINOUS TUMORS — ENCHONDROMA.

The cartilaginous tumor, carefully studied by Muller and investigated by Paget, holds an intermediate position between the fibrous and the osseous, and is an exceedingly interesting affection as regards its structure, frequency of occurrence, and size. They were formerly known as *osteosarcoma*, and often mistaken for cancer.

Characteristics.—It occurs in various parts of the body, as the ovary, testicle, mamma, and parotid gland. Its most favorite location, however, is the metacarpal

bones, Fig. 173, and the phalanges of the fingers. It is found most frequently in young subjects, especially those of a rickety, weak constitution. It is spherical in shape, smooth or lobular on the surface, usually growing slowly, and without pain. When these growths

Fig. 173.



Enchondromatous tumor; external appearance.

attain a tolerably large size, or even while they are quite small, ossification may take place in some parts, while a process of disintegration may occur in others, causing the skin which covers them to become dusky inflamed, eventually to slough and to form fistulous openings, through which a jelly-like matter is discharged. In some cases it would appear that large tumors of this description, softening in the center and becoming elastic and semi-fluctuating, have been mistaken for cysts, and have been tapped on this supposition. In small enchondroma, the opposite condition more frequently occurs, the tumor becoming indurated and undergoing ossification.

Microscopical Character.—The microscope shows a clear matrix, in places thinly granular, in others slightly fibrous, imbedded in which are cells and nuclei of various forms and sizes, some round or irregularly oval, while others are branched or caudate (see Fig.

173). Many of the spheroidal cells are granular, others have nuclei of irregular outline; interspersed among them are also a few oil globules. The general appearance is that of foetal cartilage,

Fig. 173.



Minute structure of enchondroma.

from which it can with difficulty be distinguished.

Diagnosis.—Enchondroma bear so strong a resemblance to cysts that it is not always possible to distinguish them by external examination; hence the use of a grooved needle will be required in determining their character. They may be known from fibrous tumors by their peculiar, elastic feel.

Treatment.—Consists either in excision or amputation of the affected part. When seated in the parotid region, or in parts unconnected with bone, *excision* is to be preferred; when located in osseous structures, *amputation* is the only successful resource. In some cases a permanent cure of the tumor may be effected by one or other of the methods described, but often the disease returns and grows more rapidly than before, having a closer resemblance to malignancy than in the first instance. In the reappearance of the tumor after removal, the structures are softer and assume more of a pulpaceous feel than before the operation. The internal remedies recommended for the treatment of this affection are *assafoetida*, *aurum*, *calcareae*, *mezerium*, *lycopodium*, *mercurius*, *nitric acid*, *phosph. acid*, *silicea*, *staphisagria*, and *sulphur*. Stanley has seen these tumors dispersed by the local application of *iodine* and *mercury*.

SECTION VIII.

OSSEOUS TUMORS — OSSEOMA.

[These will be considered in the chapter on Diseases of the Bones.]

SECTION IX.

CANCEROUS TUMORS — CARCINOMA.

In the consideration of tumors, heretofore, attention has been directed solely to those which are benign, or wherein is manifested

a tardy disposition, at least, to become malignant, to contaminate neighboring structures, or to return after removal. The cancerous tumor is that form of malignant growth which possesses a natural and constant tendency to affect the system, to implicate neighboring structures, and to return, after extirpation, either at its original site or at a distance from it.

Etiology.—This growth differs from all normal structures by being distinctly and essentially a new product, never under any circumstances existing in a healthy system, and possessing vital properties and an organization that is peculiar to itself. Cancer presents *four* distinct varieties, each differing from the other in appearance, rapidity of growth, color, consistence, and structure, yet all possessing so many points of resemblance and family likeness that, physiologically and pathologically speaking, they must be considered as so many varieties of one common parent. I shall classify the various forms of cancer under three distinct heads: *scirrhus*, or the hard cancer; *encephaloid*, or the soft cancer; *colloid*, or gelatinous cancer.

The *scirrhus* is the most frequent form of the disease, especially as it occurs in the breast. Possessing a low vitality, with comparatively few blood-vessels, as a general rule it grows very slowly, and rarely attains a large size. It is of a hard, stony consistence, firm and semi-transparent, of a bluish or grayish color.

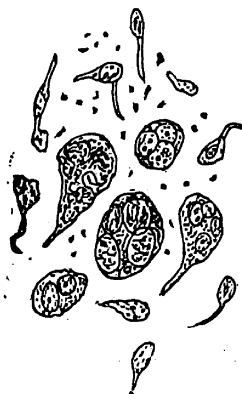
The *encephaloid* resembles brain in appearance, is soft and hemorrhagic. It usually increases very rapidly, and often grows to an enormous size. Its most frequent seat is the testicles or bones, but occasionally appears among the muscles of the extremities.

The *colloid* has the appearance of glue, or honey in its comb, and rarely appears externally, and therefore does not, in reality, come under the province of the surgeon.

Pathology.—The most striking characteristics of cancerous growths are—first, that they have no counterpart in health; second, that they consist of a peculiar fibrous stroma or basis, firmer in some of the varieties than in others. This, by pressure or scraping, yields a peculiar fluid, termed *cancer juice*, in which granules, cells, fatty and pigmentary matters, are found in varying proportions. These *granules*, which occur in largest quantities in the scirrhus cancer, are also met with in all other varieties; at times are exceedingly minute, at others amorphous. The *cells*, which are

regarded as characteristic or pathognomonic of the disease, present a great variety of peculiarities, in some instances assuming a spherical, elliptic, furiform, spindle-shaped, or caudate form, having one

Fig. 174.



or more terminations, as represented in Fig. 174. These various appearances are represented in all forms of the disease; in the encephaloid form, however, they assume a larger size, but present the same uniform characters. The pigmentary, or black-colored cells, occurring in the encephaloid variety, according to some authors, give rise to another variety of the disease, termed *melanosis*—the only real difference consisting in the *color* of the cells. These cells vary in size and shape, and often include several large globules of oil, and are more or less granular, and almost always nucleated. They are frequently seen containing two or more nuclei, and vary in diameter from $\frac{1}{700}$ to $\frac{1}{1000}$ of an inch. The nuclei are also of various shapes, sometimes spherical, at others oval, oblong, elongated, or irregular, and average $\frac{1}{2500}$ of an inch in diameter. They are usually clear, or dimly granular, and contain one (and sometimes several) large, distinct nucleoli.

According to Virchow's theory,* the cancer cells and nuclei result from the excessive multiplication by division of the cells of the affected tissue; and cancer, therefore, is not considered a *new formation*, but a pathological metamorphosis or transformation of the structure in which it is situated.

Although the tendency of carcinoma is to increase constantly and rapidly, even to the destruction of life, it nevertheless, in a number of instances, after manifesting itself locally, remains in a state of quiescence, neither advancing nor receding. Sir Benjamin Brodie mentions a case of this latter kind, where the tumor remained in this state of repose for a period of twenty-five years; Dr. Babington reports an instance in which carcinoma of the mamma was stationary for twenty-five years; and Sir Astley Cooper refers to two females in whom the period of latency was respectively seventeen and twenty-two years.

* Virchow's Cellular Pathology.

Carcinomatous diseases originate and subsist not as local evils, but are associated with a dyscrasia which precedes and engenders the local manifestations. This is exemplified by its appearance in a number of organs of the body after the first important evidence of its existence, and, also, in its original appearance in several organs simultaneously, or following in rapid succession.

The growth of cancer, say Marston and Maclimont, * increases by the multiplication of the cells, the tail-like prolongations extend into fibers which form the stroma of the tumor, and the interstices are filled with the peculiar cancer-fluid before alluded to.

When once formed, the cancerous growth increases in size and rapidity to an extent corresponding with its kind; the scirrhus variety growing most slowly, and generally attaining inconsiderable dimensions; the encephaloid and colloid, on the contrary, growing with great rapidity and to an immense size. When the tumor has completed its growth, then begins the process of decay. The mass softens at a particular point; the skin covering this space becomes inflamed, presenting a dusky and finally an ulcerated appearance; an irregular sloughy aperture forms, through which the disintegrated tissues pass away in a sanious or ichorous fluid, attended oftentimes with a peculiar, fetid smell. From this period the ulcer increases rapidly, its edges being either everted, hard, or knobby, or soft and fungous, with a discharge of dark fluid, often attended with hemorrhage, and occasionally with sloughing of a portion of its mass. Coincident with this stage, the neighboring lymphatic glands become enlarged, with increase of pain, and the constitution begins to show evidences of the peculiar cancer *cachexia*. This constitutes the *blood-poisoning*, upon which the constitutional symptoms of the disease depend. The cachexy of the system keeps pace with the ulceration, sloughing, and consecutive hemorrhage that accompany the disease, and appears to be the result of the intermingling of the cancer-cells with the blood, and their consequent inoculation through the system. The *dynamic* condition of the system is shown to be disturbed in its harmony of action, and the foundation of health is being undermined. The countenance, therefore, becomes pale and sallow, and the patient assumes a care-worn and anxious appearance. The surface of the body assumes an earthy

* Cancer, and the New Mode of Treating it.

or yellowish tint, and not unfrequently large spots of tyriasis or chloasma make their appearance; the voice is enfeebled, the pulse weak, appetite is impaired, and the general strength of body gradually and persistently diminishes. Emaciation goes on rapidly, attended with pains in the extremities; lassitude and inability for bodily exercise; the internal organs become implicated by continual deposits of cancerous matter within their structure; and the sufferer at last succumbs to the conjoined effects of pain and excessive physical prostration produced by the weakening discharges.

Diagnosis.—The *scirrhus*, or hard cancer, is more frequently met with in the breast and lymphatic glands. It is characterized by great firmness of structure, the fibrous element being largely in excess of the cancerous juice; it is on this account that the growth is less rapid, with less marked malignancy. It is first noticed by the patient, in an early stage of its growth, as a hard, incompressible, and nodulated tumor—movable, unconnected with the skin, and generally painless. At this period it may be mistaken for an enlarged gland or an indurated lymphatic. As the growth increases, a painful, aching sensation is experienced, with an occasional radiating and shooting pain through it. The pain is described as lancinating, like to a needle thrust swiftly through the part. These sensations vary according to the part affected and the sensibilities of the patient. After the tumor has been handled much, the pains are correspondingly more severe, and at night partake of a lancinating, neuralgic character. It may thus continue in a chronic state for a considerable length of time, increasing slowly, but gradually extending its caudal prolongations, at the same time implicating the more superficial tissues. In elderly people, scirrhus often gives rise to *atrophy* of the organ which it attacks, causing withering and puckering of the surrounding skin, which becomes adherent to the tumor, and continues for a long time in an undeveloped but chronic condition of disease.

Before ulceration takes place, the skin will be found adherent to the tumor either by "*dimpling in*," being drawn down toward it, or else being pushed forward, stretched, and implicated in one or more prominent projections; in this condition it assumes a livid-red and dusky appearance, glazed and covered by a fine vascular net-work. A small point next softens, gives way, and a small opening is formed through which exudes a clear, gummy fluid, which, drying,

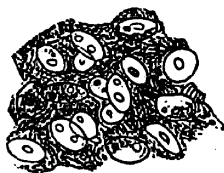
forms a scab on the surface. Soon after this, a thick, bloody discharge takes place, and, a portion of the skin sloughing away, gives rise to an open ulcer. This enlarges gradually, the edges being ragged and irregular, emitting a constant sanious and fetid discharge, with irregular masses jutting out from its surface. The pain is greatly augmented, and, the neighboring glands becoming involved, the cancer cachexia is established, and the patient is soon relieved by death. In *old* persons, the scirrhus formation often partakes of an extremely chronic character; its growth, unlike that of the young, possesses an exceedingly slow development. In young persons, and particularly in stout, plethoric women, the disease makes correspondingly rapid progress. It sometimes happens that these scirrhus growths slough entirely away, leaving a large, ragged cavity, which in time cicatrizes, and a spontaneous cure is effected. The cancerous infiltration extends a considerable distance around the tumor into the skin and subjacent tissue, forming a halo about the original tumor. In determining the question of operation, it is of the greatest importance for the surgeon to remember this and make his incisions accordingly, else a return of the disease is almost certain to occur. The existence of *enlargement* and *induration* of the neighboring glands is a matter of serious import to the surgeon, especially when contemplating surgical interference. As a general rule, excision, under such circumstances, is not to be recommended as a curative, but rather as a palliative, measure.

The *encephaloid* variety, also known as the medullary or soft cancer, is the most malignant and fatal form of carcinoma. It begins as a small and somewhat hard tumor, generally occupying by preference one of the cavities of the face, the breast, the testes, or the articular surface of a bone. Its growth is rapid, the hardened character is soon lost, and it becomes soft and elastic, being more or less lobulated, and having a semi-elastic feel. The skin over the tumor first becomes adherent, discolored, and appears traversed by enlarged vessels, which soon grow dark and livid, and finally terminate in ulceration at a certain point. Soon there succeeds a soft and bleeding fungus shooting through the ulcer, which was termed by Mr. Hey the *fungus hæmatodes*, and life is either destroyed by repeated and exhausting hemorrhages, or prolonged by a total removal of the disease. The short respite thus gained is soon, however, blasted by a return of the disease either at its primary

seat or in some more remote portion of the body. The constitutional cachexy in encephaloid is more marked, and manifested more early in this variety than the scirrhus, and secondary affections of the lymphatic glands and viscera are also more prone to occur. In rare cases, encephaloid carcinoma may be confounded with aneurism, as both pulsation and a peculiar bruit is said to have existed. A careful examination, however, of the differential diagnosis of these two diseases will prevent such an error. The *external vascular appearance* of the cancer, and the peculiar *thrill* of aneurism, will afford of itself sufficient evidence of the character of the disease. Sometimes *melanotic* matter may be intimately deposited through the mass, producing the variety of cancer known as *melanosis*. This pigmentary substance, though seen most frequently in the encephaloid carcinoma, is sometimes met with in the other forms of cancer.

The structure of encephaloid carcinoma, after extirpation, is found to be very vascular, showing under the microscope a close net-work of vessels. On making a section of it, a soft, pulpy, whitish mass is

Fig. 175.



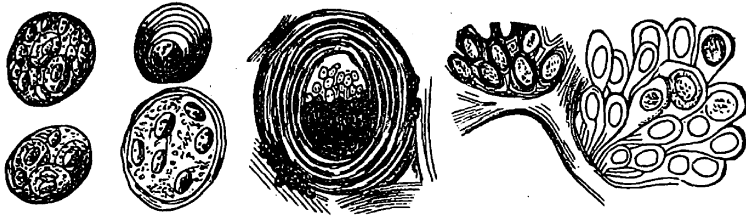
A microscopic view of the nuclei of soft medullary carcinoma imbedded in a molecular basis substance or stroma without cancer cells. Magnified 500 diameters. (After Paget.)

seen, resembling brain substance, with bloody patches here and there, varying in color from a bright red to a maroon-brown, dependent on blood infiltrated into its structure. In some cases, a section of the tumor presents the appearance of a piece of boiled udder; and in others it has been compared to that of a raw potato. Under the microscope, it is found to be composed of a stroma of delicate fibers supporting the brain-like substance, which is made up of large quantities of corpuscles, compound, nucleated, and granular, as represented in Fig. 175.

The *colloid* carcinoma, also termed the alveolar or gelatinous, is a variety of less frequent occurrence than either of the preceding. It is characterized by a gelatinous, jelly-like appearance, and is made up of a delicate, fibrous frame-work, which contains the gum-like juice. The greater the quantity of fibrous substance, the firmer the tumor will appear. It is most commonly met with in the stomach, rectum, upon the omentum, in the bones, ovaries, and kidneys, occurring in distinct masses, often attaining a large size; or it may be infiltrated into the tissue of organs. In structure it

resembles an aggregation of cells filled with a clear, gelatinous, or honey-like substance, not unlike the appearance of a honeycomb. The septa forming the cells are fibrous and regular in outline. The gelatinous matter contains caudate and nucleated cells floating within it, not unlike the same characters in the other varieties of cancer, as represented in Fig. 176.

Fig. 176.



Gelatinous appearance of cancer, with delicate fibrous frame-work, which contains the gum-like juice.

Causes of Carcinoma.—In regard to the causes of this disease, little is known. No class of society is exempt from its ravages; it attacks alike the rich and poor, the high and low, the melancholy and gay, the idle and industrious. Dr. Velpeau remarks that, in more than *one-third* of the patients under his care, the tendency to the disease existed at birth—this tendency manifesting itself at those periods of life, and in those organs, in which cancer usually develops itself. Dr. Druitt thus sums up the predisposing causes:

“1. *Descent* from a cancerous parent; which seems to have some slight influence, and was found by Lebert to exist in about one-seventh of a certain number of cases.

“2. *Sex*; for cancer is at least from one-third to one-half more prevalent in the female.

“3. *Age*; because nearly one-half of the entire number of cases occur between forty and sixty.

“Lastly, although cancer is not contagious in the ordinary sense of the term, there seems reason for believing that, if fresh cancer cells are introduced into the blood, they may be deposited and propagate themselves. The experiment has been tried on dogs by Langenbeck and by Lebert, and cancerous tumors were found in various parts when the animals were killed some time afterward; yet it must be remembered that some of the tumors found in these cases may have existed before the inoculation.”

These same experiments were repeated afterward by Vogel and Gluge, without the same results. Hence, from all our knowledge of the causes of the disease, little has been found either practical or useful. The varieties of cancer are not met with in equal frequency in all ages—the *encephaloid* being the most frequent in the young, *scirrhus* in the middle-aged and elderly, and *colloid* after the period of thirty. In many cases it has been traced to some exciting cause, as a blow or other violence, or by a long-continued irritation of a sore or ulcerous degeneration: thus, in women, cancer has been referred to a blow on the breast; and the irritation of a tooth is said to have given rise to cancer of the tongue. In all such instances, there is no doubt that a connate predisposition in the person existed prior to the violence committed, the latter being the *exciting* cause only.

Lisfrane believes the disease to arise from the development of a greater or less number of tubercles of a malignant nature, which, like ordinary tubercles, have a predilection for certain organs. He argues that, as suppuration attacks and removes tubercles not simultaneously, but by *successive* attacks, so cancer should be removed by several successive operations. The same writer believes that cancer may be developed (the predisposition existing) solely by common irritating agents, and instances the cancerous degeneration of ulcers, cicatrices, and accidental tissues. No change, he says, occurs in such cases until old age approaches, when they either spontaneously ulcerate, or do so in consequence of the irritation produced by external causes, and finally terminate in a cancerous condition. Persons who are liable to the production of permanent pimples upon the nose and lips should be careful not to excite the cancerous degeneration by rude manipulation. It is undoubtedly true that the pre-existence of the cancerous poison in the system is the parent source of all cancerous manifestations, though it may sometimes seem to be followed by external causes. Physicians in full practice may have observed, in listening to the histories of patients affected with cancer of the uterus, how frequently some of their relatives have died from tuberculosis of the lungs. The fact of cancer occurring as the result of injuries does not invalidate the theory of constitutional depravity; for there is always a considerable lapse of time between the receipt of the injury and the development of cancer. The appearance of local violence has entirely

disappeared, and the injury been forgotten, before any evidences of a cancerous formation have occurred. How often do we find severe or even fatal diseases, or the disposition thereto, existing for years latent in the system until excited by some physical cause? Take, for example, what every physician may have met with in his practice: a hearty, robust person, who, by a single unfortunate exposure, has aroused the latent predisposition, and finds his lungs the abode of tuberculous deposit, and himself irrevocably sinking to the grave. Again, if carcinoma depends upon the existence of the cancer germ alone, how is this germ produced by the local action of the part in which it is generated? If external violence is to be attributed as the cause or origin of carcinomatous diseases, such causes, continually and incessantly in operation, should be productive of myriads of cases of cancer. If it occurred locally, as the result of injury, its extirpation should make the cure complete; but the fact is, it returns again and again, until by proper medication the matrix or germ that exists in the blood is entirely destroyed.

Treatment of Carcinoma.—The treatment of cancer under allopathic therapeutics “is in just the same unsatisfactory condition,” says Tanner, “as was that of phthisis only a few years ago.” Erichsen also remarks that “all *curative* constitutional treatment is, I believe, utterly useless in cases of cancer, no constitutional remedies appearing to have any influence on the progress of this disease.” He further says: “I am not acquainted with any case of cancer, either from my own observation, from conversation with other surgeons, or from published statements, that affords satisfactory evidence of any internal remedy having cured this disease.” These opinions, and others which might be added tending to the same conclusion, afford satisfactory evidence of the hitherto incurability of this disease under the most intelligent and rational mode of allopathic practice. Indeed, the rapid substitution of one remedy for another, and the ignoring of the various principles of surgical treatment as they have been presented under the different forms of *caustics, excision, compression, congelation, leeching, ligation*, and the *actual cautery*, for other successive and new processes as they have come under the cognizance of the profession, are abundant and unequivocal evidences of the futility of allopathic resources in the curability of cancer. The preparations of *lead, iodine,*

bismuth, bromium, polassa, antimony, etc., etc., have had from time to time their enthusiastic advocates; while others, discarding these processes as possessing no curative value, have made use of the different mineral and vegetable acids, and highly extolled their use, until at last nearly *all* local treatment has been cast aside as possessing no real curative value. The only expedient that has maintained even a respectable reputation throughout the ever-changing methods for the relief of this dread disease, is

Excision.—It is also equally true that surgeons are divided in opinion as regards the propriety of this operation in cancerous diseases. Some go so far as to insist that excision is never justifiable, and should *not be performed*; while others, I think, with more mature judgment and a keener appreciation of all the circumstances connected with this disease, as strenuously argue its propriety in *certain cases* and under *favorable circumstances*. Distinguished members of the homœopathic school, falling in with the current of popular and professional prejudice, have also doubted the propriety of *ever operating* for the removal of the diseased mass, but as persistently urge its removal by the slow process of “enucleation.”

If the intention of enucleation is only to get rid of the cancerous mass, it is rational to suppose that the *sooner* this is accomplished without danger to the patient, the better. The disease being *ab initio* a constitutional one, there is no doubt that if the tumor or local manifestation thereof be permitted to pass through its several stages of growth, inflammation and ulceration, it will, by the continual multiplication of cellular irritation, increase the constitutional vice; and this augmentation of disease will become more thoroughly manifested both locally and generally. Thus, the local manifestation of and constitutional proclivity to the disease mutually react one upon the other. Hence, the treatment should embrace both local and general remedies; and among the local processes of relief, none are more prompt and beneficial than extirpation by operative procedure. By this process the diseased growth is removed *immediately*, rather than by the slow process of caustics and enucleation, which occupies from *three to five weeks*, necessarily inflicting much pain and constitutional irritation. In recommending the operation of excision, it is equally important that it be done *early*, in fact as soon as the cancerous tumor is recognized. The incision should pass entirely through healthy structures and beyond the boundaries

of disease. If the patient is not seen until ulceration has begun, the operative procedure is less beneficial and satisfactory than in the earlier stage of the disease.

The "new treatment" proposed by Drs. Marston and Maclimont, in their brochure entitled "Cancer and the New Mode of Treating it," has been so uniformly successful in their hands that it is deemed but justice to give their conclusions in full. It is at the present time the generally-acknowledged basis of treatment in the homœopathic school; and, save the difference of opinion which the author entertains so far as operative procedure is concerned, its results have been fully realized in a *number of cases treated by him successfully*. The treatment is considered under two heads—*local* and *constitutional*.

Local Treatment.*— "We may preface our remarks on the local treatment by saying that in every case of cancer treated, we thought it highly desirable to subject the patient to a little preparatory training, chiefly dietetic, for the purpose of giving as much stamina as possible, so as to enable her to bear up against the somewhat debilitating effects of the enucleation process. Meat twice a day, and a liberal allowance of the best Dublin stout, when well borne, fulfill this indication admirably. The mode of procedure for the removal of a cancerous tumor should be varied according as the disease is in a state of ulceration or otherwise. When the skin is entire, the size and bearings of the tumor should be carefully ascertained and mapped out on the breast with nitrate of silver, or vermilion pigment. A mixture of ice and salt is applied to the tumor, so as to deaden the local sensibility; this effected, and the parts carefully dried, the skin over the tumor is destroyed by means of undiluted nitric acid, the action of which is kept up until the skin assumes a tawny and yellow aspect. About thirty seconds will generally suffice to produce this condition. The part should now be well douched with cold water, and a piece of lint applied to the surface, spread with equal parts of a paste composed of a strong decoction of *hydrastis* root, powdered *hydrastis*, *chloride of zinc*, *flour*, and *stramonium ointment*. On removing this dressing at the end of twenty-four hours, a yellow, dry, and hard

* British Journal of Homœopathy—Cancer and its Treatment, by Drs. Marston and Maclimont.

eschar will be found to have been formed. The amount of pain following the application of the acid varies with the extent of surface to be destroyed, but the congelation of the parts very materially lessens this suffering, which might otherwise be rather severe."

This congelation may be effected by the use of local anæsthesia as recommended on page 143, and which serves as an excellent substitute for the ice and salt mixture. After sensibility in the part has been pretty well destroyed by either the rhigolene or sulphuric ether, as advised, then apply the paste. This process does away with a very large share of after-suffering caused by the acid; for if sensibility of the part is not destroyed, the paste will occasion considerable suffering and disquietude.

"On removing the dressing, a slight amount of erythema is sometimes visible around the eschar, which presents a yellow, horny, and dry appearance. Throughout the entire extent of this eschar, vertical incisions are made with a sharp scalpel to the depth of about one-twentieth of an inch, care being taken not to draw blood. These incisions should be parallel to one another, at a distance of about half an inch apart, and into each is inserted a thin slip of muslin or linen smeared with the paste; over the whole a *light* compress should be applied and retained in place by a strip or two of adhesive plaster. The incisions are deepened and the dressings renewed usually every day, and this is continued until the paste has percolated the entire mass of tumor. The *depth* to which the incisions should be carried depends upon the judgment of the surgeon, the success attending this procedure depending in a great degree on its correct and skillful performance. If the knife is used too freely, bleeding will embarrass and annoy both surgeon and patient, as well as materially increase the pain by exposure of the living tissues beneath to the action of the paste. On the other hand, a too timid use of the scalpel will prevent the paste penetrating into the cancerous mass, and thus arrest or rather circumscribe its action. A proper guide as to the depth of the incisions will be found in the *feel* as well as the *appearance* of the tissues thus divided, the knife passing with difficulty through the scirrhus mass, hardened by the action of the paste, while in appearance they will be found more condensed and thickened than the natural tissues. The strips of muslin, well saturated with the paste, should be carried to the *very bottom of the incisions*, and also

include the *whole length of the diseased mass*. To make sure of this, it is advised that they be prolonged a quarter or half an inch beyond the limits of the tumor, and especial care should be taken that the paste is not permitted to run down on the sound skin at the lower edge of the incisions. To effect this without danger to the patient comprises a considerable amount of anatomical knowledge as well as surgical skill, so as to avoid the risk of opening into the pleural cavity, wounding large arteries, or injuring important muscles.

“In the process of enucleation, it not unfrequently happens that a cavity containing disintegrated cancerous matter is opened. The practice in such cases is freely to expose the cavity, evacuate its contents, sponge it out carefully, and proceed with the incisions through the *flavor* of the cavity in the manner already described. The time required for the complete separation of the slough varies, of course, with the size of the tumor and the denseness of the mass to be acted upon. Generally speaking, at the end of a fortnight from the commencement of the treatment a line of demarkation forms around the entire tumor, invariably beginning at its upper or least dependent portion; this deepens from day to day; the living and healthy tissues beneath granulate and rise, pushing the tumor outward, so that at a period varying from four to seven weeks the entire mass is thrown off, leaving a much smaller chasm than might be expected, judging from the size of the slough itself.

“Immediately after the removal of the slough, the wound may present a somewhat unhealthy appearance; but a very few hours will suffice to throw off the decomposed granules still adherent to its surface, when it takes on a clean and healthy aspect, and is remarkably free from the secretion even of laudable pus.”

It is contended by Drs. Marston and MacLimon that not only is the danger of pyemia entirely obviated by this method of removal, but *all putridity* and *effluvia* are effectually counteracted by the antiseptic nature of the paste, so that large, dead, cancerous masses, weighing from twelve to sixteen or more ounces, have remained for *weeks* in contact with the living tissues without giving rise to any bad consequences or any discomfort to either patient or attendants.

Nor does the constitution sympathize much with the local irritation. Indeed, in no instance in the many cases in which this process was employed did it amount to anything more than a degree of fever—

ishness, arising, it is alleged, from the absorption of the chloride and its toxicological effect on the gastric mucous membrane; while in the majority of cases treated, even this slight disturbance did not occur—the patients, on the contrary, retaining their appetite, strength, and spirits during the treatment, and were able to be out of bed and even in the open air daily.

It is a matter of the utmost importance to ascertain whether the *whole* of the disease has come away with the slough; for if even the smallest portion be left, reproduction of the cancer sooner or later must be regarded as certain. The proper method to pursue is to remove all unhealthy-looking granulations, diseased glands, and other suspicious-looking portions, by a subsequent application of the paste. Indeed, it is the practice of the author not to permit the closure or entire cicatrization of the part to take place until it is positively proven by the aid of the microscope that no cancer cells exist in the discharges from the diseased surface.

One very remarkable and valuable feature in this treatment is the effect which the paste has upon the entire cancerous mass, in not only causing that portion of it to shrink to which it is directly applied, but in giving rise to such an amount of *drawing* or *contraction* as to bring portions even somewhat deeply imbedded in the neighboring tissues within reach of the paste. It occasionally happens that when the dead mass is ready to separate, it is merely connected with the living parts by a few small bands, which are probably nerve fibers; for as often as these bands were put upon the stretch by pulling at the slough, very acute pain on the part of the patient was induced. In such cases it is recommended that these bands be divided by the scalpel, and the dead mass be removed, when instant relief will follow. The treatment of the sore after the removal of the slough consists in the daily application of a piece of cotton or linen, spread with *stramonium ointment*, as recommended by Dr. Fell, cicatrization occurring in most cases very readily and rapidly. Enucleation of cancer by this method is applicable to those cases in which adhesions have already taken place, and which forbid its successful removal by the knife. Another advantage is that no more of the diseased mass need be removed than is actually necessary to free the part of the cancerous growth; whereas in its removal by the knife, especially after the suppurative stage has set in, it is imperative that not only the diseased part be extirpated, but

a considerable portion of healthy and unimplicated tissues. This is regarded as a most important recommendation in favor of the enucleating process over all other processes of tardy removal at present known. It may be advantageously employed not only in ulcerated but also in non-ulcerated cases; to those of recent formation as well as to those of a more chronic nature. It is unsuited, however, in those cases in which the disease has invaded neighboring glands, as well as in those strongly-marked cases of cancer cachexia which denote that the disease has invaded the internal organs, as the brain, womb, mesenteric glands, stomach, lungs, etc. Neither is it recommended in those cases where the local disease has spread to parts involving such anatomical difficulties and hazards in its removal as to make any surgical interference justifiable.

Acetic acid.—A new method by which malignant tumors may be removed with little pain or constitutional disturbance has been recently brought before the profession by Dr. W. H. Broadbent, London, England.* It consists of injecting acetic acid into the tumor by means of the hypodermic syringe, for the purpose of altering its structure and modifying its nutrition so as to retard and entirely arrest its growth. It is known that this acid does not coagulate albumen and may be generally diffused *through out the malignant growth*; it is the only agent known “which dissolves the true cancer cells.”† Fibrin, as muscle or the crassamentum of blood, also the haematin of the blood, is dissolved by it. Its action, therefore, upon cancerous growths, is that it rapidly dissolves the walls and so modifies the nuclei of cells as to entirely change their structure. Dr. Broadbent used an injection of *diluted acid* in a case of cancer which returned after being twice removed by operation, with “the entire removal of the remains of malignant disease.” In the use of the acetic acid, it is recommended to employ the first dilution rather than the pure acid, and limit the action of the remedy to the cancerous structure. The amount of destruction accompanying the use of the acid, which is considerable, is followed by a comparatively slight amount of suffering. During the destructive process, hemorrhage may ensue, which may readily be arrested by free application of a solution of *erigeron*, *hama-*

* *Vide* Braithwaite's Retrospect of Practical Med. and Surg., part 54.

† Hull's Jahr, by Snelling; article, Acetic Acid, p. 54.

melis, or the *sesquichloride of iron*, of the strength of one part of either to five of water. It has been used considerably of late, by other surgeons of eminence, with general good results.

Bromine.—This remedy, first suggested by Dr. Wynn Williams, of London, has been made the subject of experiment by Dr. Routh, in two cases of cancer treated in the "Samaritan Hospital," England. Dr. Routh explains its use and the beneficial effects resulting therefrom, in the two following cases:

Case 1.—The patient was thin, pale, and haggard, losing blood continually. There was a mass of fungoid epithelial growths, taking their origin from the os uteri, and about the size of an egg. The actual cautery was used to check the bleeding; and after the slough had come away, a solution of *bromine*—five minims to fifty of spirits of wine—was used. A piece of lint, the anterior surface of which was well saturated with the solution, was applied to the uterine-diseased surface, and kept *in situ* by pledgets of lint; after forty-eight hours it was removed, and the part dressed at night with a poultice of lint dipped in warm water, and during the day warm douches were applied. In about a week a slough came away, and left a large, healthy, granulating surface. *Tannin*, with *glycerine*, was applied, and used daily. The patient also took internally the *iodide of arsenic* and *extract of conium*. After a period of ten weeks she was fat, hearty, and well-colored; but as she occasionally lost a drop of blood, Dr. Routh carefully examined the internal surface of the uterus, and found about a quarter of its lining membrane affected with epithelioma. She left the hospital for some weeks. On being readmitted, a piece of wood of the size of the uterine cavity was prepared and covered with cotton; the upper part was dipped in a saturated solution of carbonate of soda, the lower in the bromine solution, and it was passed up and left within the uterus. Two or three further applications of bromine, with glycerine, were necessary, and the patient left the hospital with a movable, healthy uterus.

Case 2.—In this patient there was a large, carcinomatous mass, about the size of an orange, attached to the os, which appeared to be large, cauliflower excrescences, breaking down readily, and bleeding at the slightest touch. The mass was removed by the wire *ecrasur*, and a few days afterward the spirituous solution of *bromine* was applied. She took internally the *iodide of arsenic*

and *conium*, and was treated in the same manner as the first case, and left the hospital in about three months, with a movable uterus, covered with healthy mucous membrane, and looking herself fat and hearty.*

How far the *bromine* alone in these two cases went toward effecting a cure, is somewhat problematical. It is a remedy, however, of unquestionable value in the tuberculous diathesis; and its range of action being similar to that of *iodine*, may account for the effects produced in the cases above mentioned. These cases illustrate, if not the beneficial results of bromine locally, at least the good effects of *conium* and iodide of arsenic in the treatment of carcinoma; probably both.

The various remedies applied locally for the destruction of cancerous growths are so many, and their action of such doubtful value, that I deem it impracticable to refer to them further in this treatise. The process which I have used to the exclusion of all others, save, perhaps, the *nitric acid* and *bromine*, has been the formula given to the profession by Drs. Marston and Maclimont in their excellent monograph on the treatment of cancer. I am of the opinion that local applications *alone* are only beneficial in ridding the system of the diseased mass, and thus preventing the multiplication of the cancer cells, while the real cure is to be attributed to the internal or constitutional treatment.

Constitutional Treatment.—It is entirely useless to pass in review the various internal remedies that have from time to time enjoyed the confidence of practitioners, only to be supplanted by others of equal ephemeral existence in the treatment of this disease. There are a few remedies that have stood the test of experience, and which have proved themselves of undoubted efficacy, and these depend upon their homœopathicity to certain conditions of cancer. Chief among them stand *conium*, *belladonna*, and *arsenic* and its preparations.

Conium.—“The specific relationship of this remedy, homœopathically considered, to old indurations,” say Drs. Marston and Maclimont, “especially when resulting from a blow, and still more when occurring in old people, will fully account for the fact of its having removed such indurations bearing a close resemblance to

* Braithwalte's Retrospect, part 54, p. 190.

scirrhus tumors, and greatly relieving truly cancerous disease. We believe that we have here the limit of its usefulness, and attribute more of its influence in relieving the pain of cancer to this homœopathic relationship than to its general sedative action. We have had many opportunities of administering this medicine in various potencies to patients suffering from cancer, or at all events from very suspicious-looking indurations, attended with severe pain, and have frequently found relief result; and this result has been gained quite as readily with the medium potencies as with material doses. And it is in such cases, especially, that we have seen decided benefit follow its use; the more advanced the disease and the more decided the diagnosis, the less favorable has been the action of this medicine. So again in regard to

“*Belladonna*. — Its influence upon the glandular structures and its relationship to phlegmonous erysipelas and gangrenous inflammation readily suggest its employment in the ulcerative and sub-inflammatory stages of cancer.

“*Arsenic*, on the other hand, though not so readily identifying itself with the earlier physical signs of the disease, is so strikingly pointed at by the cachexia which prevails in the advanced stages that we should *a priori* be ready to anticipate for this remedy even a greater value than experience unfortunately proves it to possess. Nevertheless, we do attach value to it; but, we conceive, to be of use it must be given in doses somewhat larger than those usually administered by homœopathic practitioners. In the earlier stages it may do something to correct the dynamic condition upon which the predisposition to the disease depends, and then, given in forms varying from the second to the third centesimal trituration, it may be of service; but as a means of combating the cancerous cachexia dependent upon a material poison in the blood, we believe that larger doses will be necessary if any real benefit is to be derived from its administration.

“In addition to these, there are two other remedies which must not be passed over without a brief notice. I refer to *gold* and *animal carbon*. Both these substances appear powerfully to influence the nutritive processes and to possess a pathogenetic power of inducing a dyscrasia somewhat similar to that belonging to the cancerous diathesis.

“Walshe relates, from Duportail, a case in which a cancerous

ulcer of the face reaching to the bones was healed under the use of preparations of *gold*; but as this treatment was complicated with *hyosciamus* and *conium* internally, and *laudanum*, *cinchona*, and *camphor*, externally, it can not be relied upon, although its homœopathicity to such a case is sufficiently evident to allow of the possibility of the cure.

“*Carbo animal*.—This appears to be especially suited to those cases in which the ulcerative process is indolent, while the vital powers are greatly depressed. In the case of a lady suffering from cancer of the womb, in whom this condition existed, and who was under our care for several months preceding her death, great constitutional benefit was derived from this medicine administered in the third trituration. She rallied from a condition of almost death-like torpor, and we have no doubt that from its use some months were added to her life.

“Valuable, however, as these remedies have proved, and may still prove, we can not accord to them any specific influence over cancer, considered as a special disease. That they are homœopathic to many of the incidents of the malady, is readily admitted; and this fact sufficiently accounts for the palliation of many of the symptoms which present themselves, and may render them able to retard for a while a fatal termination.

“Dr. Fell, to whom belongs the credit of first introducing the plan of applying caustics in the treatment of cancer, by means of gradually deepening incisions through the previously destroyed parts, brought into notice at the same time a new remedy, the *sanguinaria canadensis*; but as he never used this medicine except in combination with other powerful agents, he does not appear to have relied much upon it himself, while the surgeons of the Middlesex Hospital have reported their opinion of its *complete inertness*.”

Hydrastis canadensis.—The use of this remedy as a medicine dates back into the dim traditional history of this country, when only the aborigines inhabited the continent. From the first Indian tribes its popularity as a medicine was handed down to succeeding generations, until it fell into the hands of the “botanic” system of medicine, who used it purely empirically, although its employment was highly satisfactory both to patient and physician. “In the homœopathic school, the *hydrastis* was quite extensively used by practitioners, who gained their knowledge of its properties from

'eclectic' sources for many years before the first public notice of it appeared in our journals."* "It is this medicine," say Drs. Marston and Maclimont, "that we chiefly rely upon in our treatment of cancer; usually putting our patients under a course of it for a month or so before commencing the enucleation of the mass. Our doses vary from one to two drops of the pure tincture to half a drop of the sixth dilution, the lower forms being used chiefly in those cases in which the cachectic condition is fully marked; and we must confess that we know of no medicine which has caused so great an improvement in the general health of our cancer patients as has this—an improvement which has in most cases become visible, in the bettered expression of the countenance, to all who had previously known the patient. We continue the administration of the medicine, unless intercurrent symptoms render other medicines necessary, throughout the whole course of treatment and for some weeks after its completion." Dr. Pattison, of England, has used this remedy somewhat extensively in the treatment of cancerous diseases, it is said, with exceedingly good results.

Phytolacca decandra.—This remedy has been brought prominently before the profession by Dr. Hale,† who has "found it fully equal to our best anti-psorics in the treatment of old ulcers, even of a syphilitic nature;" and he claims it to be a congener of *silicea*, *lachesis*, *arsenicum*, *kali bichrom.*, and *sulphur*. From the same authority it is stated that "*phytolaccin* has been much employed in the treatment of carcinomatous affections, and is as efficient an alterative as can safely be employed in that disease. Its beneficial effects are most apparent in cases of open cancer. The patient's system should be freely brought under its constitutional influence, and the dry *phytolaccin* applied to the ulcer. It has been found quite effectual in lupus, applied either in the form of a paste with water, or in strong alcoholic tincture when used in the early stages. An inspissated juice of the leaves has been recommended in indolent ulcers and as a remedy in cancer."

Galium aperinum.—A clinical record of the use of this drug in cancer (published in the British Journal of Homœopathy, Vol. XXIII, p. 139), by which a "hard, firm, circumscribed tumor,

* Hale's New Remedies—*Hydrastis Canadensis*, p. 546.

† Hale's New Remedies—*Phytolacca Decandra*, p. 771.

nodulated and uneven, and presenting the appearance and feel of a scirrhus formation, was cured, presents to the practitioner no little degree of interest. The tumor was imbedded in the substance of the tongue, on the right side, about an inch from its apex, gradually increasing in size until it had acquired the size of a common marble, somewhat flattened. The tumor increased so rapidly and was so large as to interfere with mastication, by which the patient became considerably emaciated. The *galium* was administered in watery extract, two ounces of the extract of the drug having been dissolved in a half-pint of water, of which the patient took one and a half drams twice a day in a wine-glass full of water. The mixture was also applied to the mouth, warm, several times a day, retaining it a few minutes during each application. In one month she had completely recovered from the pre-existing debility; the sallow and pallid appearance of the face yielded to the bloom of health, the pain gradually diminished, and the tumor had become so much reduced in size as scarcely to be discernible to the touch. Two weeks after, the tumor had entirely disappeared, and the tongue recovered its natural structure and appearance. During treatment, the diet consisted of strong beef-tea, with the daily allowance of a pint of porter.

Drs. Wynn* and Ogle contend that it has the power of correcting the peculiar dyscrasy of the blood which is found to prevail more or less in all cases of cancerous disease, by "altering and improving its disintegrated and broken-down condition." It favors the production of healthy granulations on the ulcerated surface, inducing complete cicatrization. To it is attributed the power of suspending, or at least modifying, the cancerous condition of the system, and thus placing the patient in a more favorable position for the performance of an operation for the removal of the local disease, either by the knife or the process of enucleation.

The intercurrent symptoms, as they arise throughout the course of the disease, will require to be met with appropriate remedies. If fever set in, especially of a sthenic type, it may be controlled by *aconite*; if there is at the same time a tendency to prostration, *arsenicum* is the better remedy. If dryness of the mouth and throat exists, with debility and loss of appetite, as frequently occurs during

* Medical Times and Gazette, 1864.

treatment of this disease, the latter remedy will be found to answer a good purpose. A general condition of debility without these symptoms, if not sufficiently counteracted by *hydrastis*, will demand *carbo veg.* or *china*. All other intercurrent conditions as they arise will require to be treated by the administration of those remedies which fulfill the proper homœopathic therapeutics.

With all the advantages we have gained over the allopathic practice of treating cancer, it is nevertheless a lamentable fact that we have not yet attained a well-defined, thorough, and systematic course of treating this disease; and the daily observation of practitioners is, that we are not in possession of any *certain* and really curative means of arresting its constitutional progress in all cases. It is true that the recorded statistics of a large number of patients *cured* under homœopathic medication have advanced our system of practice immeasurably beyond that of our allopathic brethren, but there are others in which the best-directed means have failed to accomplish little more than a temporary amelioration. May not the hope be indulged that, by the progressive and onward march of our system, by the accumulation and aggregation of new facts, based upon a more thorough knowledge of the immense resources of nature yet unexplored, this class of diseases may ultimately become perfectly amenable to our method of treatment?

Cases for Operation. — The cases of cancer for which an operation is not only justifiable but eminently proper, are those in which the disease appears to originate from a strictly local cause — in persons otherwise in good health and in whom no cancerous taint or cachexy is visible. If the tumor be of a *scirrhus* character, circumscribed, slow in growth, without adhesions to or implication of the skin or neighboring glands, especially if the accompanying pain be great, with immediate risk to life; and if the *whole growth*, together with a sufficient quantity of the surrounding healthy tissues in which it is embedded, can be removed with care, the operation may be looked upon as distinctly demanded.

In all *encephaloid* cancers, also, the operation is justifiable if practiced early, with the view of prolonging life.

“An important question in connection with operations for cancer,” says Erichsen, “is at what period of the growth they may be done with the best prospect of success. Most surgeons, taking a common-sense view of this question, are in favor of removing the affection

as early as possible, feeling that, as it is difficult to say when the local form of the disease becomes constitutional, it is safer to remove it as soon as its true nature has been ascertained; and I confess that I can see no advantage to be gained by delay. The necessity for early operation in *medullary* cancer is admitted by nearly all (allopathic) surgeons; but in regard to the *scirrhus* variety, many are of the opinion that delaying the operation affords the better prospect of success. Hervez de Chagoïn and Leroy d'Etiolles advise delay; they state that the operation performed after a considerable time has elapsed is productive of more satisfactory results than when done early; the cancer, often appearing to be arrested in its development, and localizing itself as it becomes chronic, shows less tendency to a speedy return after removal." The objection to this course ceases if the remedies before recommended are specific to the diseased action, as we truly believe in a great number of instances they are.

Oftentimes in delaying an operation, there is great danger lest valuable time be lost in the employment of a powerful means of arresting a disease which, although localized, may become positively injurious by contaminating neighboring glands and implicating contiguous tissues. If cancer is to be regarded as a morbid growth that will destroy life either by changes inherent in itself, or by contamination of the system, its early extirpation should also be regarded as the greatest resource of surgery, and infinitely preferable to the slow, tedious, and painful process of enucleation. It can not for a moment be doubted that by an early removal of the morbid growth the liability to local infection and wide-spread constitutional contamination will be very materially lessened. In recommending this process, it is not intended by any means to exclude *internal* treatment, this being the only true means of ridding the system of the cancerous poison pervading its organism.

Operative Procedure.—In the removal of these tumors, an important point to be attended to is the arrangement, shape, and direction of the necessary incisions, which will be specially referred to under its proper head in Operative Surgery. As a general rule, they should be made in the direction of the axis of the limb or part, and parallel to the course of its principal vessels, and should be carried *beyond* the confines of the diseased mass sufficiently far to permit the free dissection of the tumor. In simple tumors a

single incision will be all that is required; but in malignant growths, when the skin and subjacent tissues are either redundant and loose, or else adherent, an elliptical portion may be excised together with the tumor. Here the incisions must be made far enough apart to embrace not only the diseased mass, but a portion of the healthy structures around; if this is not done, slices of the tumor will be left behind, from which fresh growths will rapidly sprout, or cancer cells may impregnate the adjacent tissues and become so many new centers of diseased action. Every vestige of the morbid mass must be removed, and the fingers should be carefully passed over the whole surface of the wound, in order to detect the small tubercles that lie imbedded in the muscular tissue. In situations involving important vessels, as the axilla, neck, or groin, it is better that the handle of the knife be substituted for the edge; and, by the aid of the surgeon's fingers, the growth may be safely and entirely removed. If the tumor is found to extend more deeply than had been anticipated, in close relation with important vessels lying beneath, as at the summit of the axilla or in the perinæum, so as to prevent the surgeon dissecting it without imperiling the life of the patient, the recommendation of Mr. Liston, adopted by other surgeons, is to throw a strong whipcord ligature above the apex of the growth as high up as practicable, and then cut off every thing below this. Upon the separation of the ligature, the mass excluded will be detached as effectually as if divided with the scalpel.

In those tumors where it is found that, after dividing the fascia covering them, the attachments of the growth are not so firm or deep as in those just mentioned, they may be removed by separating the cellular tissue by the handle of the knife, using the edge to divide the deeper attachments that have acquired a cartilaginous character. The surgeon should never undertake the removal of tumors that can not be wholly and entirely extirpated, especially if they be of a malignant type, as the portions left unremoved are exceedingly liable to increase rapidly, often assuming a fungous growth and more quickly jeopardizing the life of the patient. If the surgeon has been deceived as to the depth and connections of the mass, and should he find, after commencing the operation, that the growth does not admit of entire removal, he may separate the sound from the diseased tissues as well as possible by the handle

of the knife and his fingers, and use the ligature as recommended by Mr. Liston.

After the diseased mass shall have been entirely removed, the wound should be dressed with lint or charpie, saturated with a strong solution of *hydrastis*, according to the subjoined formula,* applied cold and retained with an appropriate bandage. The dressings should be renewed twice a day, or oftener, according to circumstances, until complete cicatrization takes place. If the surface of the wound is bathed with pus, the discharge becoming too copious, *calendula* may be added to the lotion and continued as before. For the fœtor that sometimes accompanies these discharges, either of the disinfectants spoken of (page 171) may be advantageously combined with the lotion employed. *The wound should never be permitted to heal entirely until it is ascertained by the aid of the microscope that no "cancer cells" are visible in the discharges.*

The union of the wound takes place partly by adhesive inflammation, and partly by second intention; the dressings should be light and frequently repeated, the edges retained with strips of adhesive plaster, and all supported by a compress and roller.

The *constitutional* treatment should be conducted on the principles already laid down, and be persevered in for two or three months after every evidence or vestige of the disease has passed away.

If any "cancer cells" are visible by the microscope during the final cicatrization of the wound, the *hydrastis* ointment may be applied to the sore, and continued until all remaining attachments or fibrils are entirely destroyed.

By pursuing this course of treatment, the author has cured two cases of cancer given up by the most eminent allopathic authority as hopelessly incurable; and the strongest assurances are felt that, by diligently pursuing this method of practice, a large class of cases hitherto deemed to be almost beyond the resources of medicine will be ultimately amenable to this method of treatment.

* R.—Pulv. rad. *hydrastis*, ℥j.;
Aqua bull., oj. M.

PART VI.

INJURIES OF THE SOFT TISSUES.

CHAPTER I.

THE SHOCK OF INJURY.

Shock consists in a derangement of the functions of the circulatory, respiratory, and nervous systems, producing a depression of the general powers of life technically termed *prostration* or *collapse*. When the harmony of action of the great organs of the body becomes thus disturbed immediately after the injury, the condition is denominated *primary shock*; provided, however, several hours or days supervene before it is developed, it is then designated *secondary shock*.

The **symptoms** of primary shock vary according to the severity of the injury and the mental condition of the patient at the time of the accident. In marked cases, the sufferer becomes cold, faint, and trembling; the pulse is small and fluttering; there is great mental depression and disquietude; countenance anxious; incoherence of thought and speech; the surface becomes covered with cold sweat; there is hiccough, perhaps nausea and vomiting, together with relaxation of the sphincters. The *duration* of this condition is varied, depending in a great measure on the nervous susceptibility of the patient and the amount of injury sustained. In extreme cases, the depression may be so great as to terminate in death. In the majority of cases, however, reaction comes on, characterized by a renewal of the ordinary functions of the nervous system, noted in the circulation, which now tends to excessive action as much above the healthy standard as the depression was below it, thus approximating, if not actually inducing, a febrile condition.

That shock is sometimes the result of fear and nervous susceptibility, independent of the direct effect of the physical lesion, is undoubtedly true, persons having been frightened to death without the exhibition of the least local mischief. A marked difference, however, exists in the mental fortitude of individuals, some suffering excessive shock from the mere apprehension of injury, while others may be severely mutilated and give but little evidence of suffering. If the injury be sudden and unexpected, the shock is usually greater. When the feelings are roused, as in the heat of action, wounds often pass unnoticed at the time by those who receive them. It is, therefore, further evident that the state of the mind materially influences the immediate effect of an injury on the constitution. Neither is there any doubt that individuals may, respectively, possess very different degrees of susceptibility to pain, some having more acute sensations than others. On the other hand, the sudden occurrence of a severe injury will induce a physical depression independently of any mental emotion. Thus, if the limb of one of the lower animals be crushed by a blow, the force and frequency of the heart's action immediately become lessened. Here there can be no mental impression. So in man, it is found that the continuance and danger of the shock correspond with the extent of the physical lesion. Thus, if a man break his leg, and at the same time receive a blow on his abdomen, and the shock be very serious and long-continued, without sign of rallying, the probability is that some severe injury has been inflicted upon an internal organ; injury of the viscera occasioning greater severity and longer continuance of shock than a wound of a less vital part.

Secondary Shock.—It often requires the power of the keenest discernment to detect and properly appreciate the importance of the symptoms characterizing secondary or insidious shock. For it is not infrequently the case that, after a person has been dangerously contused and lacerated, as by a cannon-ball, a threshing-machine, or railroad-train, he will remain for a period of fifteen or twenty hours self-possessed and strong; with pulse accelerated very little, if any; respiration natural; surface warm; the mind active and rational. Suddenly there is a change of countenance; the lips become livid or pale; the pulse becomes exceedingly rapid; breathing, short and hurried; and he sinks slowly, as if suffocated, or falls dead, as if felled by a blow.

The *remote effects of shock* may give rise to serious constitutional disturbance—as has been pointed out by Hodgkin and James—which often does not manifest itself for weeks or months after the infliction of the injury. Some change appears to be induced in the condition of the blood, or in the action of the nervous system, that is incompatible with health—severe febrile disease, usually of a low form, supervening. Perhaps, as Hodgkin supposes, the part locally injured becomes incapable of proper nutritive action, and thus a poison results by which the whole system is influenced.

The remote *local* consequences of injury are not so obvious, but there can be little doubt that many structural diseases owe their origin to this cause. The nutrition of a part may be modified to such an extent by a blow or wound inflicted upon it as to occasion those alterations in structure which constitute true organic disease. Thus we occasionally find, in death resulting some months after injury, that extensive local mischief, usually of an inflammatory character, is disclosed, which has evidently been going on in an insidious manner from the time of the accident.

In other cases again, a blow may give rise to severe and long-continued neuralgic pains in a part, or it may be the direct cause of structural disease in bones, joints, or blood-vessels; and lastly, the origin of cancer can sometimes be distinctly traced to external violence.

Treatment.—If the disturbance be chiefly of a mental character, a few words of encouragement and cheer will oftentimes have a most happy effect; besides this, a little wine or other stimulating drink, or perhaps *ammonia* applied to the nose or given internally, will bring about the desired reaction. If the shock be very severe, and the result of a severe injury, the patient should be placed in the recumbent position, and the injured part arranged in the most comfortable manner; warm blankets should be laid over the patient, hot applications to the extremities, friction to the hands and feet; and, provided the insensibility is not complete, the internal use of *arnica*, either associated or not with alcoholic stimulants. If sensibility is entirely lost, drinks should be prohibited, and *ammonia* be applied to the nostrils and a stimulating enema administered. After reaction shall have been partially restored, *arnica* may be given internally, and a lotion of *arnica* be applied to the injured portion, of the strength of one ounce of the remedy to ten of

water, renewing the applications from time to time as circumstances warrant. If active inflammation set in, *aconite* becomes our chief reliance; and *belladonna* will be equally demanded in case of congestion of any internal organ. If the shock has been attended with great loss of blood, *china* will be of benefit, either alone or in alternation with *arnica* or *belladonna*; *phosph.* or *calend.* will also be found of great benefit in such cases. If syncope threatens, a dose of *aconite* may be interpolated with the indicated remedy.

Camphor.—This remedy, says Prof. J. C. Morgan, has done good service in shock of injury, giving relief in a few minutes. *Ammon. caust.*, where tissues of organic life were specially and severely involved, also did good service.

Veratrum is indicated when there is coldness of the extremities, with pallor of the countenance and distortion of the features, relaxed muscles, tetanic symptoms, and imperceptible breathing.

"*Coffea*, by the mouth and anus," says Helmuth, "has frequently succeeded in relieving such symptoms. It is an excellent *palliative*, but must always be succeeded by other more appropriate medicines."

Opium will be beneficial to restore the reactive power of the organism, and is especially indicated in a comatose condition, accompanied with stertorous breathing; red, bloated countenance, with frequent quivering of the lips; full, slow pulse, and profuse sweat.

If headache remain after the use of *arnica*, *belladonna*, *cicuta*, and *phosph. acid*, will be found to be exceedingly beneficial.

In concussions following collisions of railroad-trains, many sudden deaths have occurred without any apparent lesion of the external parts of the body, caused by a shock to the spinal column. In such cases, *arnica* or *opium*, or both if the accident has been attended with sudden fright, will prove eminently valuable. Pains in the abdomen or chest, accompanying such accidents, attended with coughing, spitting of blood, etc., may be combated with *arnica*. If fever set in, it will be best counteracted by the use of *aconite*, either alone or in alternation with the afore-mentioned remedy. If inflammation be the result of such accidents, involving a single organ or the entire system, it will best be combated by the remedies recommended under that head, to which the student is referred for more extended observations.

In violent contusions or injuries, when the *glands* are chiefly implicated, *conium*, *phosph.*, *iodine*, and *kali*, are indicated. When the *joints*, *synovial membranes*, or *tendons*, are the organs injured, *rhuis* becomes a remedy of great value; and when the *periosteum* is involved, *ruta* and *hypericum* promise the greatest relief.

Hypericum perforatum.—Dr. T. L. Brown, of Binghampton, Vt., in speaking of the virtues of this remedy, thus writes: "With regard to medicinal applications for the hastening of union and preventing suppuration, I am not yet able to speak with positiveness; but it seems to me that the use of *arnica* or *calendula* lotions, as commonly practiced, has not produced better results in my hands than I have usually seen from the water-dressing in the General Hospital (civil) of Vienna. The internal use of *arnica*, 200, has been found very satisfactory in relieving the general results from shock and the symptoms following it. Of *hypericum perf.* I can speak with enthusiasm. The use of it was first suggested to me by Dr. Lippe; and since that time a single dose of the 200th potency has never failed to give almost instantaneous relief to the pain resulting from the injury of parts rich in nerves, particularly the fingers and toes, and matrix of the nails. One case was of three weeks' standing: an injury of the great toe of a girl fourteen years old by the fall upon it of a heavy stick of wood. The toe was highly inflamed, with an ichorous discharge from under the nail. She had not a moment's peace with it for the pain. A solution of a few pellets of hyp. perf., 200, in water, was given two days, and a cloth moistened with the same was applied to the injury. She slept very soon, free from pain, and in a few days was well."

A question of considerable importance occasionally presents itself to the surgeon in regard to the propriety of operating "during the shock," in those cases where the severity of the accident demands operative procedure. A long and somewhat extensive experience, both in civil and military life, has induced me to lay down this general rule, viz: that the sooner an operation is performed after injury, the better is the chance of recovery. Some most excellent surgeons adhere to the consecutive operation, or that performed after reaction has become fully established. My own opinion, based upon a large experience in both of these classes, is most emphatic-

ally in favor of primary operations — the operation to be performed *immediately*, or as early as possible, after the injury; the sooner, all things being equal, the better. In fact, throughout my military career as Brigade Surgeon of Volunteers, during the rebellion, and especially in the latter part of my army life, my almost uniform habit was, when access could be had to the wounded during battle, to operate *immediately*, using the *period of nature's anæsthesia*, without reference to the reaction upon which so much stress is laid in surgical works. Besides, the best results were always obtained in those cases where the operation was performed before reaction set in at all, and while the nervous system was still obtunded by the shock. * The shock attending an operation in this condition is comparatively trifling when compared with that which follows reaction with its artificial anæsthesia; and the consecutive reaction is also less violent. In operating in those cases where reaction follows *artificial* excitement, the nerve forces are made abnormally sensitive by the stimulants given; then, by producing artificial anæsthesia, a corresponding depression, with prostration of the vital forces, takes place, which, added to the shock of the operation and loss of blood consequent upon the artificial reaction, are to my mind cogent and sufficient reasons against the delay so often practiced among surgeons. I have operated scores of times after waiting for reaction brought about by artificial means, administered anæsthetics, and concluded them; but have uniformly observed that the recovery of such patients was slower and less certain. They were more prone to take on the various complications and derangements consequent upon a prostrated vital energy than in those cases where the operation followed *immediately* upon the injury received, and during the existence of nature's anæsthesia. The shock consequent upon an immediate amputation is far less severe when the nervous system is obtunded by the injury, than when time is allowed for the system to recuperate, and then made to bear the additional burden imposed by the anæsthesia and secondary operation. In the *immediate* operation, the torn, ragged, and lacerated tissues are converted into a healthy and clean-cut surface; and when reaction follows such operation, no other shock or shocks being

* *Vide* my article, "Homœopathy in the Army," published in North American Journal of Homœopathy, vol. xii, p. 422.

imposed upon the already-prostrated system, the recovery is more marked and permanent. As an additional evidence in favor of *immediate* operation, it is well known that the presence of a crushed limb so prolongs the shock and prevents the patient's rallying (notwithstanding the administration of stimulants) as to *demand* amputation, in order to save life.

CHAPTER II.

CONTUSION OF SOFT PARTS.

In **contusion** there is always more or less laceration of the subcutaneous structures, great disorganization occasionally taking place; the *skin remains unbroken*, which circumstance distinguishes it from contused wounds.

Contusions may result from direct pressure, as when a part is forcibly squeezed; from a direct blow from a hard, blunt body; or from an indirect blow, as when the hip-joint is contused by a person falling on his feet from a height.

Compression of the parts injured is always necessary to constitute a contusion. This compression may occur between the force on one side and a bone as the resting medium on the other; or the part may be compressed between two forces in action, as between two wheels; or between a force and a passive medium—a wheel passing over a limb and crushing it against the ground.

Contusions are of various degrees: 1st, of the skin simply; 2d, with extravasation into the cellular tissue; 3d, with subcutaneous laceration of the soft parts; and 4th, with subcutaneous disorganization of the soft and hard tissues.

In all cases, extravasation of blood is the chief characteristic of contusion. In the *first degree*, the blood is merely effused into or immediately beneath the skin, producing ecchymosis or bruise; the color of which varies from purplish-red to greenish-brown, being dependent upon the changes that occur in the extravasated blood during the process of its absorption.

In the *second degree*, a bag of blood can be felt fluctuating under the skin, in which state it may remain for weeks, or even months, without undergoing any material change, unless air be admitted. In other cases, it gradually becomes absorbed; or, if it communicate with the air, the bag being opened in any way, it may undergo disintegration, suppuration taking place within or around it, and the clots discharging through an abscess. It would appear from the observations of P. Hewett and of Paget, that the clot may, in some instances, become organized and finally penetrated by blood-vessels. The French pathologists have described the formation of a cyst containing serous fluid in the site of the extravasated blood. These cysts are composed of a fibrous structure, but without cells; they have no distinct lining membrane; and in their interior, serous or grumous fluid, composed of disintegrated blood, is found. In other cases the serous or fluid parts are absorbed; and the fibrinous matter, forming cheesy concretions, is left behind. Lastly, extravasated blood may give rise to a sanguinous tumor (hæmatoma), the blood—continuing fluid for years, but somewhat changed—becoming darker, like treacle, and more or less disintegrated, being intermixed with various products of inflammation.

In the *third and fourth degrees* of contusion, the laceration and disorganization of structures usually lead to fatal internal hemorrhage, to sloughing and suppuration, or to rapid gangrene of the parts.

The *diagnosis* of contusions is not always easily made. The minor degrees may be mistaken for incipient gangrene, the discoloration not being very dissimilar, but that the part, when simply contused, preserves its temperature and vitality. In some cases the extravasated blood has a hard, circumscribed border, and is soft in the center, thus resembling somewhat a depression in a subjacent bone. This is especially the case in some bruises about the scalp.

The diagnosis of old cases of extravasation, leading to hæmatoma, from abscess or malignant disease, is not always made with certainty by tactile examination only; but the history of the case, an exploration with a grooved needle, and examination of the contents of the tumor under the microscope, will serve to clear up any doubt that may exist.

Treatment.—In the *first two degrees*, the great object should be to effect as speedily as possible an absorption of the blood. And

to this end cold applications are of especial service—*arnica* and *water*, in proportion of one to ten, being the most useful—together with slight compression. “The extraordinary virtues of this panacea lapsorum,” says Helmuth, “are not only appreciated by the whole medical profession, but as a domestic remedy its excellent qualities are fully understood, and the frequency with which it is employed with success bears testimony to its usefulness in all manner of bruises.”

As an external application, it may be used in every variety of dilution, according to the sensitiveness of the patient's skin; but the most beneficial results from the remedy in ordinary cases, according to the observation of the author, have been in the first dilution; in this form, the discoloration following injury is more certain to be prevented and absorption promoted. A very excellent preparation for simple contusions is the *arnicated collodion*, which, while it serves the purpose of absorption, also produces a little pressure upon the part, which also assists somewhat toward the absorption of the extravasated fluids. Caution should be used that the application be not too cold or too long applied, as the tissue, already very much impaired in vitality by the injury, may be entirely destroyed by an excess of cold. If inflammation to any considerable extent supervene, the *arnica* lotion may be substituted for *aconite*, in the same proportion as the former, until this process has subsided, when *arnica* may be applied again as before.

The use of *leeches*, so frequently employed by the allopathic school, can not be too severely reprobated, as they tend to kindle a new irritation in the part, and therefore predispose it to the process of disintegration and ulceration; nor can they remove in the least the blood already effused. The bag of blood that sometimes follows injury of the external structures should never be opened, however soft and fluctuating it may feel, so long as there is any probability of procuring its absorption. But if signs of inflammation continue to increase notwithstanding the single or conjoined use of *arnica* and *aconite*, the parts becoming red, hot, and painfully throbbing, free incisions should at once be made, that the already disorganized blood may be permitted to escape. The cavity may now be filled with pledgets of lint dipped in a solution of *calendula*, and the patient be treated in the same manner as recommended under the head of Ulceration.

In the *third* and *fourth* degrees of contusion, it is useless to attempt to save the life of the injured part. Here warm applications of *ruta** lotion, or poultices of ground flaxseed or other emollient, may be mixed with the *ruta* lotion and applied to the part, to hasten suppuration and the separation of the slough. *Arsenicum*, *lachesis*, *hepar sulph.*, *silicea*, and *calcareo c.*, may be given internally, according to their respective indications, as more fully discussed in the chapter on Ulcers and Mortification.

Gnaphalium pol., *hypericum perf.*, and *polygonum punct.*, are also recommended for contusions involving a minor degree of injury done the soft structures.†

In all cases of severe contusions, rest of the part and perfect relaxation of the tissues are imperatively demanded; and when ligaments and tendons are implicated, *rhus tox.* is to be preferred; and where the periosteum is injured, *ruta* or *symphytum* may be advantageously substituted for the arnica lotion.

If gangrene threaten, and the injured part assumes a bluish aspect, *lachesis*, *arsenicum*, or *carbo veg.*, may be employed both externally and internally.

When there has been a considerable loss of soft tissue from severe contusions, the part can only be restored by the process of granulation. In this condition positive rest must be enjoined, and the part be covered with *calendula* lotion; while *hepar*, *silicea*, or *mercurius*, may be administered internally to hasten granulation and facilitate recovery. If the bones or periosteum have been affected, *mezereum*, *rhus*, *ruta*, or *symphytum*, should be employed, both externally and internally.

In all injuries where there is great contusion, *arnica* should be at once administered internally; and if fever supervene, *aconite* and *gelsemium* become important auxiliaries in the treatment. When delirium follows such wounds, *bell.*, *hyos.*, or *stramonium*, either singly or in alternation with either of the foregoing remedies, according to their indications, will be found exceedingly beneficial. If the fever assume a low grade, with typhoid symptoms, *baptisia*, *bryonia*, *belladonna*, *rhus*, or *ars.*, may be employed, as the symptoms demand.

* Like arnica and other lotions, this is used in the same strength.

† Hale's New Remedies.

In the worst cases of contusion, where the foregoing treatment fails in producing beneficial effects, and disorganization of the structures of the part continually advances, amputation may be resorted to, but should never be performed only as a *last resource*.

Contusions of internal organs are always of a serious character, and require to be treated upon the general principles already laid down. The chief remedies for such injuries are *ac.*, *arn.*, *ang.*, *bell.*, *bap.*, *bry.*, *hyp. cal.*, *con.*, *euph.*, *hepar*, *puls.*, *rhus*, *ruta*, *symp.*, and *iodine*, which may be employed in accordance with their respective indications for the organs or structures involved.

CHAPTER III.

WOUNDS IN GENERAL.

A **wound** is defined as a solution of continuity in a soft tissue produced by mechanical violence and communicating with the atmosphere through a division of the integuments. The classification of wounds is in accordance, first, with the character of the instrument inflicting the injury—thus we have *incised*, *lacerated*, *contused*, *punctured*, and *gunshot* wounds; or, secondly, according as some poisonous matter is introduced into the opening—thus result *poisoned* and *dissecting* wounds. Under the first class there may also be noted a subdivision resulting from the direction of the line of the wound; hence, *longitudinal*, *transverse*, and *oblique* wounds; or, thirdly, in accordance with the region of the body where they are situated, as wounds of the *head*, *chest*, *abdomen*, *extremities*, etc.

Wounds are dangerous in proportion to their extent, the importance and condition of the part injured, the size of the vessels involved, the diathesis and age of the patient.

Death may occur from hemorrhage, tetanus, surgical fever, gangrene, abscess, etc.

SECTION I.

HEMORRHAGE FROM WOUNDS.

Hemorrhage may be either *primary* or *secondary*, according as it occurs at the time the wound is inflicted, or at any time subsequent to the application of the ligature or other means which were supposed to be permanently efficient.

In studying the subject of hemorrhage, we must first investigate the means that are adopted by nature for its suppression; and, secondly, how these may be imitated by art.

Primary Hemorrhage. — The *natural arrest* of arterial hemorrhage is accomplished by means that are in the first instance of a temporary, but afterward of a permanent, character. The means which prevent *temporarily* the flow of blood from an artery, and which, if the vessel be of small size, as the facial or radial, are sufficient in many cases to stay the bleeding without the interference of the surgeon, and by which, whatever be its size, his operations are materially assisted, are three-fold. They consist

1. In an alteration in the constitution of the blood.
2. In a diminution of the force of the heart's action, and consequently of the pressure on the inner coat of the vessel.
3. In certain changes effected in and around the artery.

First. The *alteration that takes place in the blood* consists in an increase of its plasticity as it flows. The blood that escapes from a wounded artery has a tendency to glaze and coagulate about the cut vessel, so as to offer a mechanical obstacle to the further escape of blood from it. This is of itself sufficient to arrest hemorrhage in the smaller vessels.

Second. The *diminution in the force of the heart's action* exercises a very material influence in arresting the flow of blood from an artery. The forcible manner in which the jet of blood is propelled at each systole of the ventricle, is the principal obstacle to the coagulation of the blood in and around the orifice of the severed vessel; for not only does the movement of the blood prevent coagulation, but, so long as the jet is more powerful than the cohesion of the clot, it will certainly wash the coagulum away. As the blood flows and the heart's impulse becomes gradually lessened

in force, the jet becomes lower and lower, until at last, when faintness comes on, it is almost entirely arrested, and time is afforded for the formation and the deposit of a coagulum in the vicinity of the wounded extremity of the artery.

Third. The changes that take place in and around the vessel itself are those upon which the final arrest of the bleeding is dependent. They consist of the *retraction* of the artery within its sheath, in the *contraction* of the cut ends, and in the *formation of a coagulum* around its exterior and in its interior.

When an artery is cut across, it immediately retracts within its sheath, the interior of which is left rough. Through this uneven channel the blood is projected, either flowing freely externally, or being extravasated into the surrounding cellular tissue, according to the direction and state of the wound. As the blood flows over the roughened surface of the sheath, it becomes entangled in the fibers, and tends to coagulate upon them; this tendency to coagulation is favored by the increased plasticity of the blood and the diminution of the propulsive force with which it is carried on.

By the conjoined action of these causes a coagulum is formed, which, though lying within the sheath, is outside of and extends beyond the artery, and is hence termed the *external coagulum*.

The next changes that take place in the artery, and, indeed, that are to a certain extent simultaneous with those just described, are its *contraction* and the formation of its *internal coagulum*. The *contraction* of the cut artery commences immediately after its division, and may of itself be sufficient to close the mouths of the smaller arteries. In the larger arteries this process is not sufficient to close completely the vessel, but merely gives its cut end a conical shape, thus greatly diminishing the aperture. In proportion as the open end of the artery is obstructed by the external coagulum and contracts in diameter, the blood is propelled with more and more difficulty through it until it becomes entirely at rest, allowing its fibrin to be deposited in a coagulum, which plays a more important part in the permanent than in the temporary arrest of the bleeding. To the formation of this *internal coagulum* the contraction of the vessel is subservient. This coagulum is slender and of a conical shape, the base being attached to the margins of the aperture of the vessel, and the apex extending upward. It has no point of attachment except at its base, the apex and sides being perfectly

free. Though of a firm fibrinous character at first, no exudative material enters into its composition at this period, though changes occur in it subsequently which are very important.

The *permanent* closure of a divided artery is effected by two processes :

1. By the adhesive inflammation set up in the vessel and the surrounding parts.

2. By the continued contraction of the artery.

A few hours after the division of an artery, lymph is found to have been poured out, both within and on the outside of the orifice of the vessel. The lymph that is thrown out within the vessel forms the most important part of the internal coagulum, and tends materially to the permanent closure of the wound. It is effused from the cut surface of the internal and middle coats around and immediately within the contracted orifice of the vessel, forming a small nodule projecting into its interior. If an internal clot have already formed, this plastic nodule is deposited underneath it, or is effused into its base ; if no temporary clot have formed, a conical mass of coagulum will be deposited upon this nodule, in obedience to that law of pathology by which blood tends to coagulate upon inflamed surfaces. The important part of this coagulum, pathologically speaking, is its plastic base ; the rest, however long it may be, is of no use in the permanent closure of the vessel, but, like the internal clot already described, merely serves to break the shock of the blood.

Coincident with these changes in the interior of the vessel, important phenomena occur on its exterior. Inflammation takes place within the sheath and in the surrounding parts, as a round or ovoid mass of fibrin being here effused, which is at first mixed up with the external coagulum ; the coloring matter of this, however, gradually becomes absorbed, leaving the plastic matter accumulated in a mass, and completely blocking up the end of the vessel from the outside.

Under the influence of the inflammation set up within and around, the artery goes on contracting until it embraces the included coagulum so firmly that it would appear as if it were adherent to every part of it, and some difficulty is experienced in separating them. The changes that have been described are those that occur in the proximal end of the artery. In the distal or inferior end, the occlusion is effected by the same processes essentially, but the con-

traction and retraction are not so complete and extensive; and both the internal and external coagulum are smaller, and in some cases the internal one is deficient.

The ultimate change that takes place in a divided artery is the transformation of its cardiac extremity, up to its first collateral branch, into a dense fibro-cellular cord. This is effected by the plastic effusion inside and outside of the artery with the cut and contracted vessel in the center, developing into fibro-cellular tissue.

The arrest of hemorrhage from a *punctured* or *partially-divided* artery is effected in a somewhat different manner to that described; the difference consisting in the changes that go on in the neighborhood of the wound. If the wound in the soft parts covering the artery be of small size, and oblique in direction, so that the blood does not escape with too great facility, it will be found that the temporary arrest of the hemorrhage takes place by an extravasation of blood between the artery and its sheath, by which the vessel is not only compressed, but the relations between the wound and the aperture in the sheath are altered. This stratum of blood extends for some distance within the sheath, above and below the wound, opposite to which it is thicker than elsewhere. Coagulum may likewise be formed in the tissues of the part outside of the sheath, by which the vessel is still further compressed, and the tendency to the escape of blood proportionally lessened. The permanent closure of the puncture is, however, accomplished by adhesive inflammation.

If an artery of the second or third magnitude, as the axillary or femoral, be divided one-fourth or more of its circumference, either fatal hemorrhage or the formation of a traumatic aneurism will usually take place. In those comparatively rare cases, however, in which the hemorrhage is arrested without these consequences occurring, it will be found that it is so by the vessel becoming obliterated by a plug of lymph, which is poured on the wounded part, and gradually encroaches on the cavity of the artery until complete obliteration is produced, and the vessel at the seat of the obstruction becomes converted into a fibro-cellular cord.

Such are the *natural means* and principal changes observed in and about the seat of the wounded artery; and whatever the measures adopted by the surgeon for the arrest of hemorrhage, he should imitate, hasten, or assist the natural processes, or employ analogous

ones—for all the means act by increasing the retraction and contraction of the arterial coats in forming an artificial coagulum, or in exciting adhesive inflammation in and around the vessel. The measures best adapted to secure this end have, however, already been discussed on page 158.

Secondary or Recurrent Hemorrhage may arise from a variety of circumstances, which may be divided into two great classes :

1. Those that are dependent on the vessel or ligature.
2. Those that result in consequence of some morbid condition of the constitution or of the blood.

Among the first class of causes may be mentioned any imperfection in the application of the ligature; as, for instance, its being tied too loosely, or with the inclusion of a portion of nerve, vein, or muscle; so also the accidental puncture of the artery above the point to which the ligature is applied. The rush of blood through a neighboring trunk, or collateral branch immediately above the ligature—especially if it be one that serves to carry on the anastomosing circulation—will be found to have a decided tendency in preventing the formation of an internal coagulum.

The wound of a collateral branch immediately above the ligature, though it may not give rise to troublesome hemorrhage at the time, will often bleed profusely as the collateral circulation becomes established.

A diseased state of the coats of the artery at the point of constriction will occasion rapid sloughing and unhealthy ulceration of the vessel, those plastic changes necessary for its occlusion not going on within it. Fatal secondary hemorrhage has happened from a large artery, such as the femoral, in consequence of a small atheromatous or calcareous patch having given away above the ligature a day or two after its application.

The constitutional causes of recurrent hemorrhage act by preventing the formation of a clot within, and a deposit of plastic matter without, the artery; or, if formed, cause their absorption in a few days. Among the most common of these causes are those unhealthy states of the system in which inflammation of a diffused or erysipelatous character sets in, which is incompatible with plastic effusion. In these cases, either no internal coagulum is formed, or, if deposited, is weak, imperfect, and unable to resist the impulse of the

blood; or it may speedily become absorbed or disintegrated, and hence offer little or no resistance.

The occurrence of erysipelas, phlebitis, or sloughing of the stump or wound, will prevent the necessary adhesive inflammation. Besides these conditions, there are certain states of the blood in which, from disease, as albuminaria, it has lost its plasticity, and can not yield the products of adhesive inflammation. Secondary hemorrhage is especially apt to occur in cases of pyemia, provided that affection assume a somewhat chronic character. The condition of the blood in pyemia being incompatible with the formation of a firm and plastic coagulum within the artery, it continues or becomes open, and recurrent hemorrhage will certainly occur.

The appearance of secondary hemorrhage is usually somewhat gradual, and not without warning. The blood does not gush forth in a large volume at once, but occurs at first in a small quantity oozing out of the wound and staining the dressings; it may then cease to flow for a time, but breaks out again in the course of a few hours, welling up freely in the wound, and either draining the patient by repeated losses, attended by the phenomena that characterize hemorrhagic fever, or else exhausting him so that he falls a victim to some asthenic disease, as pneumonia, erysipelas, or phlebitis.* In other cases, after a few warnings, it may burst out in a gushing stream that at once destroys life.

* HEMORRHAGIA OF WOUNDS.—Dr. T. S. Verdi, of Washington City, reports the following interesting details connected with the wound inflicted upon the Hon. Frederick Seward, which are very instructive. He writes:

“The places of the skull had been crushed in two places by the blow of the assassin Payne. The broken bones were removed, and the dura mater exposed in both places. Much loss of blood followed, but was speedily arrested. Every three or four days, however, sometimes even after a week, a frightful hemorrhage would suddenly break forth from the wounds. It was supposed that a branch of the arteria meningea media was wounded, and search was made for any spiculæ of bone that might by attrition wound *de novo* this artery. There was great anxiety to get at this artery, but it was impossible without running the risk of injuring the dura mater. These hemorrhages would appear so suddenly, and were so *profuse*, as to endanger life. Compresses were applied instantly, and the hemorrhage would cease. One night, however, while Surgeon Norris and myself were watching this hemorrhage, and were ready even to apply a heated wire to the artery under the cranium, the hemorrhage suddenly ceased without interference. The next hemorrhage stopped in the same way. We came to the conclusion, then, that these hemorrhages were caused not so much by the wound in the

The blood, in the great majority of instances, comes from the distal, and not from the proximal, side of the wound. The greater tendency in the distal end of the vessel to bleed appears to rise partly from the less perfect occlusion of this portion of the artery, and partly from its greater liability to slough, in consequence of the ligature interrupting its supply through the vasa-vasorum. It is no objection to this opinion that fatal hemorrhage is often of an arterial character; for, though it is true that the blood which is carried to the distal end is of a venous hue for the first few days after the application of the ligature, yet after the collateral circulation is once established it gradually assumes a more scarlet tint, and at last becomes completely arterialized.

Secondary hemorrhage may come on at any time between the application of the ligature and the closure of the wound. There are, however, three periods at which it is particularly apt to occur: 1st, a few days after the ligature has been applied; 2d, about the time of the separation of the ligature; 3d, at an indefinite time after its separation.

The hemorrhage which occurs a few days after the application of the ligature arises either from some imperfection in tying the ligature, from disease in the arterial coats, causing them to give way, or from want of adhesive inflammation in the face of the stump. When from the latter cause, there is a general oozing from many points of the surface rather than a gush from one orifice. In those cases in which the artery has been tied above the wound only, hemorrhage is very apt to occur at this time.

When hemorrhage occurs at about the time of the separation of the ligature, it may arise from any of the causes already specified that interfere with the formation of an internal coagulum, or that occasion sloughing of the coats of the vessel.

Lastly, in some cases in which the ligature has separated, but the wound has remained open, the hemorrhage may take place either

artery as by a determination of blood to the head, the impulse of which would expel the clot that was formed in the wounded branch, and that when the vessels were disgorged the hemorrhage would naturally stop. I noticed, also, that previous to these hemorrhages the pulse would become much stronger, and the face slightly flushed. We enjoined, then, low diet, and the hemorrhages appeared no more.

“This shows that the wounds of small arteries, that can not be reached by ligatures, can only heal by anemia.”

from the cicatrix in the artery being too weak to support the impulse of the blood, or from the coagulum being absorbed in the way already mentioned. The continuance of the open state of the wound after the separation of the ligature is probably dependent upon a morbid condition of the coats of the vessel, which eventually leads to hemorrhage. The length of time that will sometimes elapse between the separation of the ligature and the occurrence of hemorrhage is very remarkable: there is a preparation in St. Thomas Hospital of a carotid artery from which bleeding took place in the tenth week after ligature; and South mentions a case of ligature of the subclavian, in which the thread separated on the twenty-seventh day, the fatal hemorrhage occurring in the thirteenth week.

The **Treatment of Secondary Hemorrhage** must be considered as the bleeding takes place: 1st, from a stump; 2d, from an artery tied in its continuity.

In all cases of ligature of arteries, care should be taken to keep the patient perfectly quiet, maintaining the general health in as good condition as possible, and avoiding any undue traction in the ligature itself.

1. The treatment of secondary hemorrhage *from a stump* will depend in a great measure on the degree of union that has taken place between the flaps. When bleeding occurs a few days after amputation, if there be but slight oozing, elevating the part, applying cold, and bandaging it with a roller, so as to compress the flaps, is sometimes all that will be required. In addition to these expedients, a process of exceedingly great value in these cases is to apply a tourniquet moderately tight around the limb; not with so much pressure as to interfere entirely with circulation in the extremity, but with just sufficient power to moderate the flow of blood through the important artery, and thereby diminish the current through the bleeding vessel. I have found this an exceedingly valuable auxiliary in the secondary hemorrhages following gunshot wounds, and have no doubt that by its employment many valuable lives have been preserved that without it must have been lost.

If it continue, however, or become more severe, the flaps, which will have been disunited by the effusion of blood, must be separated and the bleeding vessel found and tied. In some cases the ligatures will not hold; under these circumstances, styptics or the actual cautery will be demanded. If the oozing appear to be general, the

flaps being somewhat spongy, the hemorrhage may be sometimes arrested by clearing their surfaces of coagula, and then bringing them tightly together by means of a roller.

If the hemorrhage occur at a later period, after the eighth or tenth day, when tolerable union has taken place, and appears to proceed from the principal artery of the part, an effort should be made to arrest it by the application of the tourniquet, as before advised, which will often prove efficient; or, if it still continues unchecked, the union which had taken place between the flaps having broken through, the stump may be fairly opened up, the coagula washed out, and the vessel tied. If, however, several weeks have elapsed, or if, notwithstanding the hemorrhage, the union between the flaps continues sound and firm, then the choice lies between ligaturing the artery in the stump itself by making a fresh incision, or continuing up the old one; or else in ligating the vessel at some convenient point above the stump. The former method is generally to be preferred, the patient thus escaping the dangers of a second formal operation.

2. When hemorrhage occurs after a ligature has been applied *to the continuity of the vessel*, whether for injury or disease, pressure must first be tried. With this view, the wound should be plugged and a gradual compress should be very firmly and carefully applied. Not unfrequently, however, this will prove ineffectual, the bleeding recurring from underneath it. In this case the compress should be applied with the greatest care, after clearing away the coagula and drying the parts thoroughly; but should it fail in spite of the perseverance of the surgeon, nothing remains but to resort to a plugging of the wound, if the artery be situated on the trunk, as the subclavian, carotid, or one of the iliacs. When, however, the artery is situated in one of the limbs, other means can be employed. If it be one of the arteries of the upper extremity, the wound should be opened up, and an attempt made to tie both ends of the vessel. Should this fail or be impracticable, the artery must be tied at a still higher point; and should the bleeding still continue, or be re-established, amputation is the only resource left.

In the lower extremity, the treatment of this form of secondary hemorrhage is replete with difficulty. Here it is useless to tie the artery at a higher point than that to which the ligature has been already applied, as gangrene almost invariably follows this double

ligature of the arteries of the lower extremity. Under these circumstances, it may be recommended to cut down on the bleeding part of the vessel, treating it as a recently-wounded artery, applying a ligature above and below the part already deligated—an operation which is not without difficulty. Should this, however, be impracticable, or not succeed in checking the hemorrhage, we are next to consult the safety of the patient by amputating at once on a level with the ligature. Although this is a severe measure, it is infinitely preferable to allowing him to run the risk of the supervention of gangrene, which would require removal of the limb under less favorable conditions. If the hemorrhage occur from a wounded artery, to which ligatures have already been applied above and below the seat of wound, the same treatment must be adopted as in those cases in which the bleeding takes place from the application of the ligature to the continuity of the vessel.

CHAPTER IV.

SPECIAL WOUNDS.

An **incised** wound is one made by a clean, sharp-cutting instrument.

A **lacerated** wound is one made by forcibly tearing the parts asunder, and is inflicted by blunt, dull agents, as stones, bludgeons, etc., or by machinery.

A **contused** wound results from a division of the soft parts, accompanied by more or less contusion or bruise.

A **punctured** wound is one inflicted by a sharp-pointed instrument that makes an aperture small in proportion to its depth.

A **penetrating** wound passes deeply, communicating with a cavity of the body.

A **poisoned** wound is one having virus, or an irritant of some kind, introduced into it.

A **gunshot** wound results from an explosion of gunpowder, whether caused by a ball, a splinter, or a piece of rock, etc.

SECTION I.

INCISED WOUNDS.

Definition.—An incised wound is one with smoothly-cut edges.

Characteristics.—Incised wounds are usually open, communicating freely with the air. Occasionally, however, when made by the surgeon, they are subcutaneous, only communicating externally by a small puncture; they may be simple, merely implicating integument and muscle, or complicated with injury of the larger vessels and nerves, or of important organs. In all cases they give rise to three very marked symptoms, viz: *pain*, *hemorrhage*, and *separation of their sides*.

The *pain* of an incised wound is usually of a burning, cutting, or smarting character. Much depends, however, on the extent and situation of a wound, and also whether the cut is made from the cutaneous surface inward or from within outward, being greater in the former than in the latter case, owing to the section of the nerves being made from the branches toward the trunk. When the incision is from within outward, the trunks being first divided, the branches are paralyzed, and do not feel the subsequent incision.

The amount of *hemorrhage* necessarily depends upon the vascularity of the part, as well as the size of the wound. The proximity of the wound to the center of the circulation, or to a large vessel, also influences this very considerably — different parts of the same tissue bleeding with different degrees of facility. Thus, the face pours out more blood when cut than the leg.

The separation of the lips of the wound depends on their tension, and the position of the part, as well as on the elasticity and vital contractility of the tissues. It is greatest in those parts which are the most elastic, or possess the greatest degree of tonicity.

Diagnosis. — The definition and characteristics already given are quite sufficient to determine the nature of the wound.

Prognosis. — After a permanent arrest of hemorrhage has been secured, and if there exist a tendency to union, the general health of the patient being good, a favorable prognosis may be given.

Treatment. — In the *local* and *constitutional* treatment of an incised wound, efforts should always be made to procure union by the first intention or by adhesive inflammation between the surfaces,

which, if obtained, will save the patient much time and trouble. Though the surgeon may sometimes fail in securing union by *the first intention*, still his treatment should be conducted with a view to this kind of union, as it does not in the least interfere with the subsequent healing by *granulation*.

The *local* management of an incised wound includes three great indications:

1. The *arrest of hemorrhage*, which is to be accomplished by some of the various methods referred to on page 158.

2. The *removal of foreign matter*, such as dirt, pieces of stone, or glass, including the coagulated blood. This should be accomplished, if possible, by pouring a stream of water over the surface, great care being taken not to irritate the lips of the wound.

3. The *coaptation of the opposed surfaces*, which is to be maintained by an attention to position, by an application of sutures, plaster, and bandages. As a general rule, the sides should not be brought together until all hemorrhage has ceased. The parts should then be brought gently in contact, due attention being paid to relaxing them as much as possible by position, so there may be no gaping of the lips, or tension on the sides of the wound.

Sutures should be used sparingly in *all* wounds, and only in incised wounds, where the tendency to gaping can not be overcome by position, plasters, etc. The ordinary silk ligature, well waxed and twisted, fulfills an excellent purpose. By some surgeons the silver suture is considered superior to the silk. In those wounds where it is necessary that a considerable traction should be exerted upon the suture, I have always employed the twisted silk ligature; whereas, in those cases where little traction is required and little deformity as possible be left, my preference is either for the silver or finest silk suture. The *serrefine*, Fig. 177, is appropriate when very accurate union of the lips of a wound is required, as in cuts about the face, lips, eyes, etc. Other various expedients required in the treatment of wounds are more fully pointed out on page 66 and following, under the head of Apparatus of Dressing. *Collodion* is often preferable to plasters, either alone or in addition to sutures, and may be used as recommended on page 74. Among the remedies which may now be



employed as an external application, *calendula* is eminently the most serviceable, being especially applicable to incised wounds; and, indeed, the value of this agent in facilitating the healing process by preventing or in arresting suppuration can not well be overestimated. It may be applied directly to the part by saturating lint or cloths with a dilution of the tincture, in the proportion of one part to five or ten of water, according to the severity of the case.

In those instances in which union was not effected by the first intention, inflammation taking place in and around the edges of the wound, the lips becoming swollen and red, a sero-sanguinolent discharge, gradually assuming a puriform character, exuding—a warm lotion of *calendula* or *erigeron* should be immediately applied, previously removing all sources of irritation, as sutures, etc.

Aconite and *belladonna* dressings may also be found serviceable in these cases. *Arnica* is also of use in the treatment of incised wounds, but is more adapted to those accompanied by a bruise. *Momordica balsamina*, like *calendula*, is particularly applicable to open wounds, and is a remedy which merits favorable consideration.

Hypericum perf. is a remedy of great value in the treatment of open, *painful* wounds, attended with general prostration from loss of blood, with a feeling of weakness and trembling in all the limbs, languor on rising, fainting from physical effort, thirst, and heaviness of the head. In local congestions, and in capillary erethism, accompanied or not with hemorrhage and great nervous depression, following wounds, I have found it an exceedingly valuable agent; and in such wounds, I have no doubt, its reputation will be enhanced by future use, until it is proven as much a specific for such wounds as *calend.* is for suppurating surfaces, or *arnica* for bruised tissues.

The constitutional treatment consists in maintaining the general health of the patient by the removal of all sources of irritation from the system, keeping him upon a nourishing but unstimulating diet, and combating the inflammatory action by the internal administration of *calendula*, *arnica*, or *aconite*. Should there be marked indications of sympathetic fever, the latter two remedies may be alternated. If much blood have been lost, or the patient debilitated, *china*, in alternation with *arnica*, should be given.

Staphysagria and *momordica bal.* are also valuable.

Sulphur must be administered at night in those cases in which there is evidence of a psoric taint, and will often effect a cure without the aid of another remedy.

SECTION II.

LACERATED WOUNDS.

Definition.—A lacerated wound is one that is torn rather than cut, and may be inflicted by machinery, cannon-balls, splinters of wood, or any rough, blunt-edged instrument, as a dull knife, or a saw.

Characteristics.—A most important condition in this kind of wound is that of the vessels; these are usually separated lower down than the other tissues, for, being elastic, they elongate before giving away. There is little or no hemorrhage owing to the breaking of the inner and middle coats, thus allowing the external coat to be twisted over the orifice of the coats previously divided in such a manner as to offer of itself no inconsiderable barrier to the escape of blood. The arteries are also stimulated to increased contraction and retraction by the violence. The nerves become more or less paralyzed, and hence the pain is generally slight and of an aching or dull character. The edges of the wound are ragged and uneven, and, owing to their tendency to slough, always unite by the second intention.

Diagnosis.—The kind of instrument inflicting the injury, the absence of hemorrhage, and the character of pain, will be quite enough to render the diagnosis easy.

Prognosis.—This is much less favorable than that of incised wounds, in consequence of their mode of union, together with their liability to gangrene and secondary hemorrhage.

Treatment.—The general indications are the same as those given for incised wounds, such as the arrest of hemorrhage, when it exists, cleansing the parts, coaptating the edges, etc. In placing the flaps in apposition, however, strips of adhesive plaster are chiefly to be relied upon, avoiding sutures altogether as a rule, and keeping the parts at rest.

Hypericum perf., as a local application in lacerated wounds, and in fact in all wounds before suppuration sets in, stands pre-

eminent among the most valuable remedies of the *materia medica*. It acts directly in removing the ill effects of shock, prevents in a great degree sympathetic irritation of the system with the local derangement, and modifies to a corresponding degree the subsequent inflammation and sloughing. In recent cases, and after spasmodic action of the capillary system has passed away, it should be used in the proportion of one part of the tincture to twenty of warm water, and kept diligently applied to the abraded surface. After a time, however, and when suppuration takes place, it should be substituted for *calendula*; and in the more severe cases the suppurative process should be sustained if not promoted for two or three days by the application of a warm emollient poultice of the flour of the *ulmus flava*, medicated with the *calendula*. If inflammation of a low type set in, with tendency to gangrene, or if the pus appears of a dark, sanious, unhealthy character, a warm flaxseed poultice answers a better purpose, having its surface well sprinkled over with the *third* trituration of arsenicum. The *hypericum* in the slighter forms of lacerated wounds, if applied early, will sometimes entirely arrest, and always modify, the occurrence of ulceration and sloughing. By its use I have succeeded in preserving the vitality of torn tissues when almost entirely separated from the body; and in compound fractures of the hands and feet, with great laceration of the soft tissues, the *hypericum* has produced the most beneficial results. In a case of compound dislocation of two fingers, with severe laceration, in which the fingers were attached by a narrow bridge of skin only, I succeeded by the use of this remedy in saving the parts, the bones uniting perfectly on being replaced and maintained in apposition. After a part has been replaced in this way, it should be retained *in situ* by a few points of *fine*, interrupted suture, and a few strips of Tallman's collodion plaster, all to be covered with the *hypericum* lotion and retained by properly-adjusted rollers. The sutures should remain until complete union is effected. In ordinary cases of lacerated wounds, whether superficial or deep, from the sixth to the twelfth day there is considerable danger of secondary hemorrhage when the slough begins to detach, especially if an artery of any size has been implicated in the injury. This hemorrhage may be severe if not promptly treated on the general principles already laid down.

Surgical interference. — In all cases of lacerated wounds, the

surgeon should be careful not to condemn a limb that admits of a fair chance of being saved. With the knowledge that the homœopathic practitioner possesses over that of his allopathic brother, in treating the after-effects of lacerated and contused wounds, such as *crysipelas*, *gangrene*, *phlebitis*, etc., he can, with a greater certainty of future success, afford to wait before sacrificing an injured limb, be it ever so severe. Under judicious homœopathic treatment the prospect of recovery is largely increased, and the necessity of amputation, so frequently forced upon allopathic surgeons by reason of their want of knowledge of these valuable remedies, is almost entirely dispensed with. I have seen cases of *severe con-*

Fig. 178.



tusions and *lacerations* following gunshot wounds, which allopathic surgeons had condemned for operation, improve and finally recover entirely under well and judiciously applied homœopathic remedies. The following cases, as a type of this class of injuries, admitted into the U. S. General Hospital at Mound City, Ills., while under my charge, afford striking evidences of the success attending homœopathic remedies, a synopsis of which is appended:

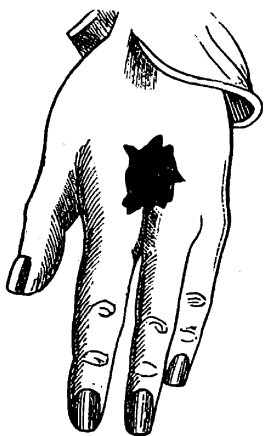
Case 1.—William Casey, private, Co. K, 1st Regiment Missouri Volunteers, received a shell wound, at Fort Donelson, in the calf of the leg, tearing away large portions of integument, the gastrocnemii, soleus, and plantaris muscles, fracturing the fibula and splitting off a piece of the tibia, inflicting a severe, lacerated and contused wound 9 inches in length, 5 inches in width, and three and a half inches deep.

When admitted, the wound was suppurating freely, with considerable constitutional irritation. The limb was condemned by the surgeon of hospital steamer, but the free use of *calendula* externally, *hepar sulph.* and *silicea* internally, with an occasional dose of *aconite* to allay febrile action, good nourishing diet, etc., carried the case to a successful termination; Fig. 178.

Case 2. — William Colyee, private, Co. D, 10th Regiment Mis-

souri Volunteers, was wounded in the hand, at the battle of Fort Donelson, by a musket-ball, fracturing and comminuting the first, second, and third metacarpal and carpal bones. The third metacarpal bone was extensively comminuted, and split in fragments, which I removed. The hand was laid upon a wide splint after all fragments of bone had been removed, and dressed with *calendula* lotion. Considerable suppuration followed, but by no means proportionate to the injury, and little or no constitutional irritation supervened. The remedies administered internally were *calendula*, *hepar*, *silicea*, *china*, and *ruta grav.*; diet generous and nutritious. The patient left the hospital on a furlough five weeks from the date of entrance, with the wound nearly filled up with healthy granulations, and motion slightly impaired in the remaining fingers. Since then I have learned that the wound is perfectly healed, and the hand as good as ever, save the loss of one finger. See Fig. 179.

Fig. 179.



Case 3.—Michael Kelly, seaman on the gunboat *Pittsburg*, was wounded in the left shoulder by a fragment of shell at the battle of Fort Donelson, and admitted into hospital February 21st. The wound extended from the anterior part of the deltoid, upward and backward ten inches, to a point nearly opposite the second dorsal vertebra. The spine of the scapula was fractured and considerably comminuted; and the body of the bone, denuded of its soft structures, was laid bare, as were also the outer borders of the ribs lying in juxtaposition—the edges of the wound gaping from two to five inches in diameter, and presenting an extensive sloughing surface. The splintered portions of the spine of the scapula, and a part of the body of the bone, were removed; adhesive straps were employed to coaptate the wound, *calendula* dressings applied, and a roller to keep the dressings in position. Suppuration was excessive. The remedies given internally were *assafœt.*, *aconite*, *hepar*, *ruta*, and *silicea*, according to indications. July 3d the wound was entirely healed, and presented the appearance of Fig. 180 (on page 642). Motion of the shoulder was perfect, except when attempting

to elevate the arm, which caused some pain. *Graphites* relieved this in three days. The patient returned to duty July 12th, 1862.

Fig. 180.



(a) Appearance of wound after being healed.

The question of amputation in lacerated wounds is therefore very much modified by the use of homeopathic remedies, and should be attempted only in order to save the life of the patient, and *not with the view of preventing the occurrence of gangrene*, so much dreaded by allopathic physicians; it should be performed primarily under the following circumstances only:

1. If one of the extremities is torn off by machinery; cut off by the wheels of a railroad-train; or carried away by a piece of shell or cannon-ball, producing an uneven, irregularly-conical stump, amputation should be performed, that the ragged and uneven surface may be transformed into a clean-cut surface, and a healthy and more useful limb made for the patient.

2. If the whole thickness of a limb is injured, the soft structures and the bones crushed, the nerves and arteries lacerated and torn, producing a pulped and disorganized mass, removal of the injured limb must be effected at once, and, if the surgeon is called in time, during the natural period of anæsthesia; that is, while the system is suffering from the effects of the shock of injury.

3. If the large joints, such as the knee and elbow, be extensively opened, and the soft parts lacerated and torn, the important vessels and nerves supplying the structures severely injured, the limb must be sacrificed to save the life of the patient.

If in our attempts to save an important limb (and all are important), erysipelas or gangrene should set in, the treatment recommended under these heads must be consulted and used accordingly.

The constitutional treatment is to be conducted with a view of *first* removing the effects of shock, which can be promptly accomplished by the administration of *arnica* or *hypericum*, either alone or in alternation. After reaction has fairly taken place, the

second indication is to modify the existing fever, which may be accomplished by the use of *aconite*, *gelseminum*, *veratrum*, etc., as recommended in the treatment of inflammation. If high fever, delirium, or determination to the brain or other vital organs, take place, *aconite* may be alternated with *bell.*, *hyos.*, or *stram.*, according to indications. If a low grade of fever occurs, with a marked tendency to typhoid, *ars.*, *bry.*, *bap.*, *rhus*, or *carbo veg.*, are serviceable. When ligaments and tendons are implicated in the diseased process, *rhus*, *ruta*, and *symphytum*, are particularly called for. If gangrene threaten, *china* and *lachesis* should be administered promptly; and if the wounded parts take on a bluish tinge, and the patient's strength sinks rapidly, *ars.*, *carbo veg.*, and *verat.*, become important means of cure. If the periosteum and bones are implicated, *assafæt.*, *mezer.*, *phosph. ac.*, and *ruta*, should be employed; the latter remedy is particularly valuable when the carpal or tarsal extremities are involved. When suppuration is excessive, attended with constitutional irritation and debility, *china*, *calend.*, *hepar*, *merc.*, *silicea*, and *sulph.*, must be employed, according to existing symptoms. In caries and necrosis, *aurum*, *calc. phosph.*, *merc.*, *mezerium*, *hepar sulph.*, *silicea*, and *sulphur*, are indicated.

All complications of whatever character and degree, involving any particular organ, will have to be treated as they arise. It will be only necessary in this connection to notice the most frequent derangements and the remedies necessary for their cure.

As an *external* application, *calend.* is valuable on account of its preventive and controlling influence over the suppurative process, and should be administered internally as well as applied locally.

Momordica bal. is highly spoken of by Drs. Hill and Hunt as a valuable remedy for lacerated wounds. My experience in the use of the remedy is somewhat limited. I have no doubt, however, from the encomiums lavished upon it by the last-named authorities, that it will be proven an exceedingly valuable remedy in certain kinds of lacerated wounds.

Hypericum perf. is also highly recommended by Dr. Brown, of Binghampton, Vt., in all wounds where there is much pain, as a result of injury to parts rich in nerves, particularly the fingers and toes, and matrix of the nails.

If considerable contusion accompany the laceration, the *calend.* and *arnica* lotions may be beneficially alternated—that is to say, the *calend.* may be employed for two or three days, and the *arnica* dressings alternated for the same length of time, and so on until the full benefits of the two shall have been developed. If fever arise during this treatment, *ac.* will be indispensable.

If ligaments and tendons become implicated in the morbid process, *rhus*, *ruta*, and *mezereum* lotions are beneficial. *Erigeron can.*, applied in the form of lotion, consisting of one part of the drug to five of water, will be found exceedingly beneficial in secondary active hemorrhage of small vessels. *Hamamelis* is also a remedy of merited repute in passive hemorrhages from engorgement of the capillary vessels.

During the whole course of treatment, attention must be given to entire rest of the injured part, cleanliness, generous and supporting diet, and the due observance of the laws of hygiene.

SECTION III.

CONTUSED WOUNDS.

Definition.—A contused wound is one that is accompanied by a contusion or bruise, there being more or less extravasation of blood into the surrounding cellular tissue, producing swelling and discoloration. A “black eye,” with laceration of the integuments, is a somewhat familiar example.

Characteristics.—There is rupture of the small superficial vessels, causing an extravasation of blood (ecchymosis); and in severe cases the injury of the larger vessels occasions augmented effusion into the tissues, attended with more or less alteration and destruction of the parts by sloughing. The suppurative process is liable to be profuse and long-continued, thus inducing hectic fever; or pyemia, erysipelas, or typhoid fever, may occur. There is always a marked tendency to gangrene, especially in debilitated constitutions, and it is usually of the most fatal variety. They are particularly liable to secondary hemorrhage.

Treatment.—In the milder cases the indications are to prevent a further infiltration of blood into the tissues and to promote the absorption of the fluids that have already escaped. This can

readily be accomplished by the application of arnicated lotion; or, in the absence of this, a piece of cold raw beef or poultice of raw potato. In severe cases, the foreign matters having been removed, the wound cleansed, and the hemorrhage arrested, the parts should be as neatly coaptated as possible, never removing any torn flap provided it maintain any attachment; the limb should be placed in a position combining elevation, relaxation, and comfort.

Arnica is here the great specific, to be used both internally and locally. In the case, however, of persons of delicate skin or predisposed to erysipelas, or in wounds of the scalp, it should be largely diluted and its effects carefully watched. Provided the inflammatory action run high, with scarlet redness and aggravation of pain, *aconite* water should be substituted, to be followed by *calendula*. *Belladonna* or *cantharis* is to be employed in case erysipelas threatens, which will be indicated by chills, flashes of fever, headache, quick pulse, with a simultaneous drying up of the secretions, the margins of the wound becoming slightly swollen and of a red blush. *Rhus tox.* may also be serviceable here, being particularly adapted to injuries implicating ligaments or tendons.

Warm poultices may be used to hasten the suppurative process and the formation and expulsion of healthy pus. As soon as it is evident that an abscess is to form, after the use of *aconite*, *bell.*, *bry.*, and *ledum*, for the removal of severe constitutional disturbance, *hepar* or *silicea*, either alone or in alternation, may be given to facilitate the pointing of the abscess, which should be *opened* as soon as fluctuation is felt; if the surrounding integument assume a dark-red or bluish appearance, with an œdematous condition, *ars.* and *lach.* will be demanded. *Baryta* and *conium* are useful when induration takes place around the borders or within the deep tissues of the abscess. As soon as suppuration becomes fairly established, the diet should be generous and the patient's health be sustained by the best-directed efforts of the surgeon. If chills and fever supervene, with restlessness, prostration, burning pains, sweats, etc., *arsenicum* should be given and continued until amelioration takes place, when some other remedy may be substituted. The treatment throughout will be the same as that advised under the head of Abscesses and Ulcers, page 257.

In the constitutional treatment, where there is great contusion,

arnica * should be administered; and if high fever, with delirium, ensue, it may be alternated with *aconite*, *bell.*, *hyos.*, or *stram.*, according to the peculiar symptoms. After the indications for these have subsided, *calendula* will usually be found useful; and should the discharges become profuse and weakening, *china officinalis* is to be given in alternation with it. But if the patient become very much prostrated, *arsenicum* or *carbo veg.* should be given.

Arsenicum and *lachesis* are invariably indicated upon the super-vention of gangrene. *Ruta* is useful in injuries of the periosteum, or tarsal and carpal joints. *Assafoet.*, *mezereum*, *phosphoric acid*, and especially *symphytum*, have been recommended in cases involving the bones. These cases will be treated on the general principles already given, and the remedies recommended for lacerated wounds are beneficial to a certain extent here. Rest, good diet, cleanliness, and hygienic measures, are to be enforced equally in this as in the other forms of local injury.

SECTION IV.

PUNCTURED WOUNDS.

Definition. — A punctured wound is one made by a sharp-pointed instrument, and deep as compared with its extent on the surface. It comprehends all those lesions which are produced by nails, thorns, pins, needles, splinters of wood, pieces of bone, and fragments of glass, or by the thrust of a dirk, bayonet, lance, etc. In every-day life punctured wounds are frequently met with in the hands and feet of the working classes. In dissections and autopsies, punctures frequently take place, and the introduction of the peculiar septic virus generated in the body is oftentimes productive of the most serious results. Punctured wounds vary much in extent, direction, and character, and are dangerous in proportion to the important structures injured beneath. The *pain* attendant upon these wounds is often very severe, depending rather upon the injury sustained by the nerves of the part and the bruised condition of the tissues than the extent of the lesion.

* *Hypericum perforatum*, *cynoglossum officinale*, and *helianthus*, have been highly recommended as substitutes for *arnica*. Their indications, however, are not well defined.

Characteristics.—Not unfrequently punctured wounds are somewhat contused, being made by a triangular or wedge-like weapon, as a nail, a bayonet, or lance-blade. Hence, they partake of the general character of contused wounds, having a tendency to unite by granulation and to be accompanied by much inflammatory fever.

Diagnosis.—Knowing the kind of instrument inflicting it, together with an examination of the wound, will readily enable the surgeon to form a correct diagnosis.

Prognosis.—This should be guarded in all severe cases until after the ninth day. Tetanus is more likely to occur in consequence of this variety of wound than of any other. The bleeding of punctured arteries is sometimes very difficult to arrest, and the irritation of nerves wounded in this manner is always very marked. They become dangerous, too, from their liability to traverse the great cavities and injure the contained viscera. Pus is apt to burrow under the muscles and become infiltrated into the tissues; while danger is also to be apprehended from the presence of foreign bodies which may have lodged in the wound. *Erysipelas* is liable to follow punctured wounds; also contraction of the limbs, and atrophy of the muscular structures. Punctured wounds of the scalp, hands, and feet, are particularly prone to be followed by severe nervous and inflammatory symptoms. The suffering is always greatest, other things being equal, in persons of an irritable and nervous temperament. Much, also, will depend upon the nature of the object inflicting the wound; as, for example, the puncture made by a trochar in the operation for paracentesis produces but little nervous disturbance, in comparison with that of a nail which penetrates the sole of the foot, injuring the plantar tissues. The shock attending this variety of wounds is sometimes severe, and is liable to be followed by excessive prostration; even a slight puncture is often followed by severe constitutional disturbance.

Treatment.—The treatment of punctured wounds consists, *first*, in the extraction of the foreign body, in case of its lodgment; *second*, in checking hemorrhage; and *third*, in moderating inflammation and preventing the development of nervous symptoms. The first point is determined by simply inspecting the vulnerating body. If a fracture has taken place, and the missing part lies deep in the tissues, it may be necessary to open the wound to an extent sufficient to enable the surgeon to extract the offending

object. In such a case, caution must be exercised in the avoidance of important structures, especially nerves, vessels, and tendons.

In the majority of cases, unless the injury be a slight one, supuration and union by the second intention will take place; while in the slighter cases, union by adhesion is obtained. In earlier times, when duels with the small sword were of frequent occurrence, persons called "suckers," who were drummers of regiments, were employed to accompany the principals of a duel and attend the wounded combatant. Their treatment, which they endeavored to mystify by certain cabalistic signs, consisted in sucking the wound until blood ceased to flow, then applying a pellet of chewed paper or a piece of wet linen to the orifice. They healed many sword thrusts in a few hours or days. The process of suction cleansed the wound of all coagulated blood, and, drawing the sides into close apposition, greatly facilitated its healing. It is thought this principle might be closely imitated by the application of a cupping-glass and air-pump. The variety of punctured wounds most frequently met with in ordinary practice are occasioned by needles penetrating into and breaking off within the body. They are sometimes exceedingly difficult to remove, and often demand of the surgeon the utmost patience and perseverance to dissect them out. A safe plan is never to cut down upon these objects unless they can be felt either by the finger or an instrument. In attempting to remove a small piece of glass driven into the wrist and broken off, a few days since, I found an exceedingly troublesome dissection, and only succeeded after the most patient and diligent perseverance in ridding the patient of this painful object. The particle of glass lay imbedded between the flexor tendons and ulnar artery, and the danger consisted in dividing the coats of that vessel. If the penetrating object be small, lies deep, and has been lodged for some days, the surgeon will almost certainly fail in extracting it; and unless the indications of its presence be very clear, it is advised that it be left undisturbed, and trust to nature for its elimination from the body. Mr. Marshall's plan to detect the presence of a needle in the tissues consists of a powerful magnet, which is laid over the part for a quarter of an hour, so as to influence the fragment; after which a nicely-poised polarized needle is suspended over it, when, if any iron be present, deflection will take place in the direction of the object.

The bleeding in punctured wounds, if produced by a small object, as a pin, needle, splinter, etc., generally ceases spontaneously; but when it is within a large cavity, as the abdomen or thorax, it is beyond the reach of the surgeon, and more than ordinary difficulty may be experienced in controlling the hemorrhage. The blood wells forth in a continuous stream, and the vessel cut is hidden in the deep tissues. In such cases, cold styptic injections of the *per-sulphate of iron*, *erigeron*, or *hamamelis*, thrown with considerable force into the opening, often produce salutary effects; but if this prove insufficient, pressure should be applied by means of compresses adjusted so as to approximate the sides of the puncture. In some cases, too, the tampon, page 158, may prove of service. This operation, however, is both painful and difficult; the plugging must *commence at the bottom* of the wound, and completely fill its whole cavity, a piece of adhesive plaster being applied over it so as to retain the tampon. Subsequently there will be no haste to remove the plug, as the great danger attending these wounds is hemorrhage, and to remove the clot early will be to expose the patient to the danger of secondary hemorrhage. If violent inflammation is produced by reason of the tampon, it will be necessary to remove it cautiously and gradually. Provided, however, these means are not sufficient to stay the bleeding, it remains for the surgeon to cut down to the wounded vessel and apply a ligature both above and below the seat of injury. Completely dividing the artery will frequently cause it to retract and contract so that the flow of blood will be readily arrested.

The irritation is to be allayed, and other unfavorable consequences modified, by an application of *ledum pal.*, *belladonna*, or *cicuta*. Teste states that "*ledum* is for wounds inflicted with sharp instruments what *arnica* is for contusions," which remark is well sustained by clinical experience. In the first stage, *aconite* alone or in alternation with *bell.* will usually be indicated. When suppuration threatens, *hepar*, *mercurius*, or *silicea*, may be given; though here, as in all other wounds that are disposed to suppurate, *calendula* will be found the most reliable remedy. If the inflammatory action runs high, with much pain and tension, warm fomentations or emollient poultices of *ulma flava*, ground *flaxseed*, or *elm-bark* moistened with *calendula* water, should be employed, keeping the patient on a low diet.

It is very important, too, for the surgeon to recollect that in the treatment of punctured wounds it is necessary to keep the orifice open by a tent or meche of lint, which should be rendered pliable and unirritating by the use of *hydrastis* or *calendula cerate*. A free escape of pus is thus permitted, and the wound allowed to granulate from the bottom. Otherwise, if the integuments be allowed to heal first, abscesses will form; and the discharges, burrowing under the deep-seated structures and infiltrating into the tissues, will render the injury exceedingly complicated, and much time and trouble will often attend the most skillful treatment ere the case is conducted to a favorable termination.

SECTION V.

POISONED WOUNDS.

Definition.—In a poisoned wound there is a certain amount of noxious, irritating matter introduced into the opening.

Characteristics.—The constitutional effects of poisoned wounds are generally very marked, delirium or stupor often supervening almost immediately. The inflammation is usually violent, and of an unhealthy character, resembling erysipelas; pus forms, having a tendency to become ichorous, the inflammatory action being accompanied by ulceration or sloughing, which spreads with rapidity. Hence, the effects of the various poisonous substances are produced in two ways: 1st. By their direct depressing influence upon the nervous system; 2d. By inducing a kind of diffuse inflammation of the cellular tissue. The rapidity with which some of the most virulent poisons manifest their peculiar effects is somewhat remarkable; in some cases scarcely ten seconds elapse ere the patient suffers from the shock produced. In certain other varieties of poison, as in the bite of the *rabies canina*, the interval may be prolonged—the period of incubation continuing weeks, and even months. Others, again, first manifest their effects locally, giving rise to a characteristic vesicle and sore, the system sympathizing as the local difficulty increases, as in malignant pustule, for example.

Diagnosis.—A history of the case is all that will be required to render the diagnosis simple.

Prognosis.—The prognosis should always be guarded, but will

for the most part be determined by the kind of poison introduced into the system.

The **classification** of poisoned wounds is in accordance with the character of the virus introduced; thus we have those arising from the bites of serpents, of rabid animals, the bites and stings of insects, dissecting-wounds, etc.

§ 1. — The Bites of Serpents.

The **symptoms** occurring after a poisonous snake-bite consist in great depression and prostration of the system, a feeble and intermittent pulse, dilated pupils, usually slight delirium, speedy stupor, insensibility, and death.

The pain in the part bitten is of a burning, tingling character, particularly violent, and often creates a brief spasm. The swelling is rapid, and becomes livid in a few hours; and if the patient survive sufficiently long, diffuse inflammation and gangrene occur; involuntary evacuations take place; asthenic symptoms set in, which may eventually terminate fatally in the manner already mentioned, or end slowly, and, after a lapse of time, in the recovery of the patient, whose health may suffer long and seriously from the effects of the accident.

Treatment.—The indications for treatment are to be fulfilled by employing both local and constitutional measures. The *first* indication consists in preventing the absorption of the virus; *second*, to prevent a fatal termination of the nervous depression.

The **local** means are—1st, to make free incisions in and about the wound, so as to induce hemorrhage, in hopes of washing out the noxious matter; 2d, apply dry cups or suction by the mouth, which should previously be rinsed with whisky or brandy, after which the parts should be rubbed with *olive oil* or *aqua ammonia*; or poultices of *tobacco*, *plantain*, and *hoarhound*, may be applied, administering at the same time a strong decoction of the latter. As soon as constitutional symptoms begin to be manifest, such as giddiness, fainting, and vomiting, *arsenicum* or *carbo veg.* should be immediately given. Should the symptoms, however, continue to increase in severity, stimulants must also be given, such as *brandy* or *whisky*.

Dr. Miller, of South Carolina, relates a case of a man bitten by a large rattlesnake. His head and face soon became prodigiously swollen and black, “the tongue enlarged and out of his mouth, his

eyes as if starting from their sockets, his senses gone, and every appearance of immediate suffocation." Two tablespoonsful of *olive oil* were administered with great difficulty. The effect was almost instantaneous and remarkable: in thirty minutes it operated on the bowels, in two hours he could articulate, and recovery was rapid. In several similar cases the oil has proved equally successful.

Peake, of Mississippi, reports a case of rattlesnake-bite in which the patient chewed and swallowed two ounces of tobacco, which did not even nauseate him. The limb swelled very little and the patient soon recovered.

It is a commonly-received opinion that drinking brandy or whisky, or some similar stimulant, until the patient has taken enough to produce extreme intoxication, is to be relied upon with the utmost confidence. And, indeed, clinical experience goes far to show that stimulants are a valuable remedy. But notwithstanding this treatment has been successful in many cases, it is not advisable to give alcohol in such quantities as to make the person *absolutely insensible*, as is often done; for, should the depressing effects of the serpent's venom be simultaneous with those of the stimulant, the case would be in no wise favorable.

The *cau de luce*, a preparation which is said to owe its efficacy to the *ammonia* which it contains, enjoys a high reputation in some tropical countries. Large doses of *arsenic* have been employed from time to time as a specific; and the "Tanjore pill," a celebrated Indian remedy, owes its curative action to this medicine. It is an exceedingly dangerous remedy in heroic doses, and must be taken with a great deal of caution, lest the remedy prove as fatal as the disease for which it is administered. The second and third triturations are recommended as the best forms of employing this mineral. The experiments recently made by Dr. Hammond, ex-Surgeon-General U. S. A., and by Mr. DeVesey, of California, as to the prophylactic and curative powers of "Bibron's antidote" to the bite of the rattlesnake, go far toward proving its efficacy in this variety of poisoned wounds. The formula for the preparation of this mixture, as furnished by Prince Paul, of Wurtemberg, the celebrated naturalist, to Mr. DeVesey, is as follows:

R.—Potassii iodide, gr. iv;
Mercurius corros., gr. ij;
Bromine, ℥v. M.

The dose of the remedy is ten drops in a tablespoonful of wine, whisky, or brandy, to be repeated as often as necessary. It should be kept in well-stoppered glass vials, and preserved in a dark place.

In several cases in which it has been administered to persons bitten by poisonous reptiles, the effect was almost like magic. It is a standard preparation in the United States, and furnished by the Medical Department, U. S. A., to surgeons in the army, especially for poisonous wounds from reptiles. I used it, during my service in the army, in two cases of wounds from poisonous reptiles, with the most satisfactory results, and believe that its curative properties are equally efficacious in hydrophobia.

An application of dry heat has been highly recommended by Dr. Herring, who writes as follows :

“The best domestic remedy against the bites of *venomous serpents, mad dogs, etc.*, is *radiating heat*. This should be done by the readiest means at hand—a red-hot iron, or a live coal, or even a lighted cigar, for instance, must be placed as near the wound as possible, without burning the skin or causing too sharp pain; but care must be taken to have another instrument in the fire, so as never to allow the heat to lose its intensity. It is essential, also, that the heat should not exercise its influence over too large a surface, but only on the wound and the parts adjacent. If oil or grease can be easily procured, it may be applied around the wound, and this operation should be repeated as often as the wound becomes dry; *soap*, or even saliva, may be employed when oil or grease can not be obtained. Whatever is discharged in any way from the wound should be carefully removed. The application of heat should be continued in this manner until the patient begins to shiver and to stretch himself. If this takes place at the end of a few minutes, it will be better to keep up the action of the heat upon the wound for an hour, or until the affections produced by the venom are observed to diminish. Internal medicines are to be judiciously administered at the same time. In the case of a BITE FROM A SERPENT, it will be advisable to take, from time to time, a gulp of *salt and water*, or a pinch of kitchen salt, or of *gunpowder*, or else some pieces of garlic.

“If, notwithstanding this, bad effects show themselves, a spoonful of brandy or wine, administered every two or three minutes, will be the most suitable remedy; and this should be continued till the

sufferings are relieved, and repeated as often as they are renewed. If the shooting pains are aggravated, and proceed from the wound toward the heart; and if the wound become bluish, marbled, or swollen, with vomiting, vertigo, and fainting, the best medicine is *arsenicum*. In case *arsenicum* exercises no influence, though repeated several times, recourse must be had to *belladonna* or *lachesis*. *Senega*, also, frequently proves efficacious.

“Against chronic affections, arising from the bite of a serpent, *phosph. ac.* and *merc.* will generally be most beneficial.”

§ 2.—Bites of Rabid Animals.

The danger of the bite of a rabid animal proceeds from an introduction into the wound of a modified secretion of saliva, giving rise to the disease known as *hydrophobia*.

If the bite be inflicted by a dog, the poisoning receives the name of *rabies canina*, though the same class of symptoms may be caused by the bite of a wolf, a cat, and also of a jackal or badger. The bite of a rabid animal is most dangerous when inflicted on a naked part, as on the hands or face. A person bitten through clothing often escapes any ill effects, in consequence of the teeth being wiped comparatively free from the poisonous saliva ere it reaches the skin. Hence, a number of persons may be bitten by the same animal and perhaps not more than one in twenty take the disease. Mr. Youatt observes that a dog infected with *rabies* first exhibits signs of restlessness; then becomes cross, and disposed to growl and bark at everything coming in his way; as the affection becomes further developed, he manifests a greater or less degree of ferocity, runs wildly about, not even recognizing his master, whom he is disposed to bite in common with every one he meets. His voice becomes changed; mouth hot, and tongue projecting; he licks stones or any cold object, to relieve the parched condition of his jaws. The appetite next becomes morbid; he eats dirt, stones, rags, or anything that presents itself, as is shown by post-mortem examinations. Mr. Youatt also states that the popular opinion that a rabid dog shuns water is erroneous, as there are cases on record in which the fatal wound was given while the animal was drinking. They have also been found dipping their heads into the water up to their eyes to relieve the feverish state of the mouth. The idea of their

avoiding the water probably originated in view of the fact that an attempt to swallow almost invariably induces a spasmodic affection of the muscles of deglutition; hence, the victim experiences a horror of all liquids. This difficulty in swallowing is owing to an excessive sensibility about the pharynx and throat, in consequence of which every effort at deglutition induces reflex action, commonly throwing the patient into convulsions. Cases are reported, however, in which no such difficulty occurred.

The time that intervenes between the bite and the appearance of the disease varies widely, ranging from forty days to even twelve years. Elliotson regards the average period of incubation as continuing from six weeks to three months.

Symptoms.—The wound has generally cicatrized long before any symptoms of hydrophobia declare themselves, and no peculiar appearance is presented by the scar. Shooting pains, itching and twitching sensations, have occasionally been experienced in the site of the wound before the supervention of an attack; and it is probable that in all cases some process analogous to a zymotic action takes place within, before the disease becomes manifest. The precise nature of this, however, requires to be elucidated by further observation.

The general symptoms are usually ushered in by some antecedent phenomena for two or three days. These initiatory symptoms consist of giddiness, chills, flashes of fever, and a general feeling of discomfort. The more special symptoms never exhibit themselves until the disease becomes fairly established; they consist of extreme nervous irritability and apprehension, with convulsions, induced by various external influences, whether acting on the surface of the body or on the fauces; or they may be occasioned by mental impressions, and in either case speedily end in exhaustion and death.

These more special symptoms may be arranged under three heads: 1st, those consisting of a spasmodic affection of the muscles of deglutition and respiration; 2d, of the extreme sensibility of the surface and the senses; 3d, excessive mental agitation.

First.—The sufferings and convulsions which patients experience when they attempt to drink, appear to be owing to *excessive sensibility of the nerves of the mouth and pharynx*, and the recollection of those sufferings makes them fear to repeat the

attempt; hence, the fear of liquids, from which the disease derives its name.

A catch in the breathing, resembling that which often occurs when a person goes into a cold bath, is met with as one of the earlier symptoms, taking place in the midst of conversation, and before the patient's mind is directed to the nature of the disease. This catch is due to a spasmodic descent of the diaphragm, and gives rise to severe pain at the pit of the stomach, or a feeling of suffocation, and a return of the convulsions.

Second.—An extreme degree of sensibility of the surface, and of some of the senses, is characteristic of hydrophobia. The sensitive nerves become so excitable that a blast of cold air, the rustling of the bed-clothes, the slightest touch on the skin, will induce convulsions. The nerves of sense become equally excitable, so that a sudden flash of light before the eyes, as the reflection of the sun from a mirror, or a sudden noise, as the slamming of a door, will produce the same effect. The noise produced by liquids being poured from one vessel into another is particularly distressing to the sufferer.

Third.—An extreme degree of mental agitation and terror, a vague sense of dread and horror at the impending fate, is one of the earliest symptoms of this truly terrible disease. Delusion sometimes occurs of a spectral character, the patient imagining himself to be surrounded by animals, by horrid forms, by gaping, ghastly countenances. These delusions may alternate with fits of delirium and frenzy. The movements of the tongue and mouth, induced by the clamminess of the viscid and ropy mucous saliva, give the patient the appearance of attempting to bite. Occasionally all the symptoms subside completely before death—the increased sensibility of the surface disappearing, the mental agitation or delusion being removed, and deglutition and respiration being quietly performed.

The disease may prove fatal in twenty-four hours, or may be prolonged six or seven days; death, however, generally occurs from the second to the fourth day, and is apparently induced by exhaustion.

Pathology.—The post-mortem appearances throw no light whatever upon the disease, the changes observed being regarded as the effects rather than the cause of the spasmodic irritation. The tongue, the throat, the fauces, the glottis, and the larynx, the

oesophagus and stomach, the brain, the medulla oblongata, and spinal cord, have all been found congested and inflamed; still, there is nothing in the appearances presented by these parts that affords any clue to the real nature of this inscrutable and terrible malady.

Treatment.—The treatment is to be divided into two stages, the *prophylactic* and the *curative*. In having recourse to preventive measures, it may be borne in mind that the larger proportion of persons bitten by rabid animals do not fall victims to hydrophobia—the probability of the occurrence of the disease depending partly on the animal that bites, and partly whether the bite is inflicted upon the naked or clothed parts of the body. Thus, Watson states that, out of one hundred and fourteen persons bitten by mad wolves, sixty-seven died of hydrophobia; while, according to Hunter and Vaughan, only one out of twenty or thirty bitten by mad dogs takes the disease. This latter statement may possibly be somewhat lower than the truth; yet the fact remains certain that wolf-bites are far more dangerous than dog-bites, and this is probably owing to the circumstance of wolves always flying at the face and naked parts.

The *preventive* treatment consists in the administration of *hydrophobin*, *lachesis*, or of *belladonna*, at an interval of four or five days, the latter remedy meriting the most confidence. *Excision* of the part should be carefully and freely performed, notwithstanding the above prophylactics may prove sufficient. In practicing excision, no half-way measure should be indulged in, but the operation should be thorough, and performed by passing a probe to the bottom of the wound and excising the whole by cutting out a conical piece of the tissue, taking care to go beyond the furthest limit to which the probe has passed. If there be any doubt of the whole of the injured parts having been removed, *potassa fusa* should be applied. Youatt, to whom we are largely indebted for our knowledge of hydrophobia, permitted himself to be bitten a number of times, and, by pursuing this treatment, never experienced the least inconvenience from the effects of the poison.

Dr. Herring expresses the utmost confidence in the efficacy of distant or radiating heat, which should be applied to the recent wound three or four times a day until the wound is healed without leaving a colored cicatrix, as recommended in case of envenomed wounds, page 658.

The *curative* treatment consists in removing all external irritation, whether mental or bodily; putting the patient in a darkened room, as much removed as possible from all noise and the intrusive curiosity of visitors, and preventing entirely the disturbing influence of draughts of cold air; avoiding also the sight or attempted administration of liquids.

The remedies recommended, and which from their pathogenetic effects are regarded as the most reliable, are: *belladonna*, *hyosciamus*, *hydrophobin*, *lachesis*, *stramonium*, *cantharides*, and *cuprum*.

Belladonna is indicated by the following symptoms: ineffectual attempts to sleep; anxious breathing; frequent desire to drink, which is rejected as fast as offered; burning and dryness in the throat; glistening eyes, with red, bloated face; excessive thirst, with suffocating constriction of the fauces whenever an *attempt is made to swallow*; fear of imaginary objects, with an irrepressible desire to spit and bite at the attendants; great restlessness of the whole body, and jactitation of the muscles of the face. *Lachesis* may often be alternated with *bell.*, with great benefit, in the more violent stages.

Hyosciamus is preferable when the convulsions are more permanent, particularly when affecting the extremities; face bluish-red; inclination to sleep, which is disturbed by startings, anxious visions, and dreams; constant delirium, even when no paroxysms are present; or when the patient is taciturn, exceedingly spiteful, with paroxysms of rage, during which he endeavors to injure others; is bellicose rather than fearful; the dryness and burning of the throat is not so permanent as those of *bell.*, and the suffocative constriction less frightful when swallowing, although the same dread of drinks exists; swallowing frequently induces convulsions.

Hydrophobin is regarded as an important prophylactic in this disease; and from the experiments made by Prof. Herring, I have no doubt it will become a most valuable *prophylactic*, and possibly an important agent in the treatment of the disease itself. The curative results are at present, however, too unreliable to merit particular confidence.

Stramonium. — Hydrophobic convulsions have been cured by this remedy. It causes a spasmodic constriction of the fauces, so that not even water can be swallowed. It should be selected when

the spasms are more permanent and the patient becomes so frantic that he has to be confined; delirium and great restlessness, dryness of the fauces and mouth, irresistible aversion to the sight of water, desire to bite and tear everything, loquacious mania, gesticulations, loss of memory and consciousness.

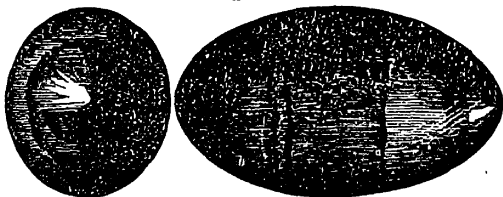
Cantharides has been highly praised by Drs. Hartlaub and Trinks, as a preventive of hydrophobia; but Dr. Hartmann thinks it more appropriate for alternate paroxysms of rage and convulsions; with fiery and flashing eyes, which roll about in the fiercest manner; swallowing is difficult, owing to a burning and dryness of the mouth and pharynx; there is an *excessive desire for sexual intercourse*, with painful and constant erections, attended with itching and burning. In general, it seems that *canth.* is more closely indicated in the inflammatory period, and when the impeded deglutition and spasms are produced by violent inflammation in those parts.

Gelsemium, *lobelia*, and *scutellaria*, are also recommended as remedies of value in the treatment of this affection.

Webb's remedy,* so called from the name of the family who had dispensed it for more than a century—composed of the fresh leaves of the box-wood, two ounces; fresh leaves of rue, two ounces; sage, half an ounce—is said to be so far a preventive of this disease that out of ninety animals bitten, only one went mad.

The mad-stone.—The belief in the absorptive powers of certain kinds of stone to extract the virus of poisonous bites is still common. We frequently hear of wonderful cures performed on those bitten by venomous reptiles or rabid animals. The stone from which the accompanying plate is made (Fig. 181) is said to have been procured from the rennet of a deer. The figure represents the curiosity in full size, one a longitudinal, the other an end view, showing the shadings on its surface.

Fig. 181.



It is an almost perfect ellipsoid, slightly flattened in the line of its short axis, 'as will be seen in the transverse view, and seems to be composed of the phosphate of lime. This stone was taken from

* Hale's New Remedies.

the stomach of a deer shot in Georgia. Similar concretions are not unusual in the deer's stomach, the younger ones having them of small size, while in the older animals they are much larger. It has been used, it is said, very often, with the most satisfactory results, both in the sting of bees and the bites of serpents, as well as those of rabid animals. Its constituents are totally unlike the concretions found in the bladder of the human body, which are indicative of disease. In the opinion of certain chemists and geologists, it is said to be a mineral production, accidentally or purposely swallowed by the animal, and not the product of animal disease. Without subscribing to the popular belief in its virtues, but as a *curiosity* alone, it is thought to possess sufficient interest for the profession to know these few facts concerning it. The material for these stones is found, it is said, in the calcareous and silicious soil about the salt-licks which deer frequent, and, being of an indigestible nature, it remains in the stomach, gathering excretions and becoming rounded in form by the muscular action of this viscus. Similar stones, called "bezoars," have been known and used in the East from time immemorial, and are found to be concretions surrounding some foreign substance in the stomach of ruminants. *Use*: The blood being first pressed out the wound, the stone is applied, which drops off as soon as it is full; it is then to be washed in lime-water, and reapplied until all the poison in the wound is entirely extracted.

Bibron's antidote.—This preparation, from its well-known curative properties in the bites of poisonous serpents, insects, etc., seems to be a valuable agent in the treatment of hydrophobia; and no doubt the beneficial effects following its use in poisons of the former class will be equally verified in those of the latter class whenever its qualities shall be tested.

§ 3.—The Bites and Stings of Insects.

In the bites and stings of insects, as of the mosquito, bedbug, spider, wasp, bee, hornet, etc., there is seldom any serious inconvenience, though the itching or pain is sometimes very considerable; yet occasionally they may even prove fatal, by inducing erysipelas in some unhealthy constitutions, or by giving rise to intense irritation by the multiplicity of the stings, as by bees swarming upon

and stinging a person; or they may be dangerous in consequence of an important part being stung, as the eye, or the interior of the mouth, or pharynx, as has happened in swallowing a bee in a piece of honeycomb. Some insects, however, as scorpions, or the tarantula in Italy, always give rise to serious and sometimes even fatal disturbance by their bite.

Treatment.—The bite or sting of such insects as are peculiar to our climate is successfully treated by using an external application of a weak dilution of *arnica*, or by employing *aqua ammonia*, *camphor*, *lemon juice*, or *olive oil*. M. Teste writes: “Against mosquito-bites, a single teaspoonful of a tumblerful of water in which a few globules of the fifteenth dilution of *ledum* had been dissolved, quieted completely, in a few minutes—I might even say in a few seconds—the itching caused by the bite, without any application being necessary. Also the stings of wasps and bees have been treated with *ledum* in a most satisfactory manner.”

Should erysipelas threaten, which will be indicated by the swelling becoming tense, hot, and with a scarlet blush, *belladonna* should be given; and if fever supervene, *aconite* is to be administered in alternation. If there is a bluish cast about the seat of the injury, with a dull, aching, or a bruised sensation, together with nervous irritation, *arnica* becomes the most important remedy.

For the stings of a wasp or bee, Drs. Hill and Hunt have been for several years in the habit of using but one remedy, which consists in slicing a *raw onion* and applying a section to the part injured. The piece is to be changed every fifteen or twenty minutes. I have also found it efficient.

Before applying any of the above remedies, however, the wound should be carefully examined to ascertain whether the *sting* remain; if so, it should be withdrawn with a delicate pair of forceps.

§ 4.—Dissecting - Wounds.

The majority of wounds received in dissection are not dangerous. Every student in anatomy frequently cuts and punctures himself in dissecting during his course of studies, and it is but rarely that we see any ill consequence following these injuries. In some cases, however, the most serious results ensue, terminating in permanently impaired health, or even in death.

This result depends partly on the state of health of the person injured, and partly on the condition of the body from which the wound is received. If the health be broken by any cause, whether by excess of study or dissipation, very serious effects may follow that would not occur had the patient more resisting power; hence, it is of much importance to those engaged in the practical study of anatomy not to allow their health to become impaired to any great extent.

The deleterious influence exercised by the dead body may be attributed to three different causes. Thus, it may be supposed to result from the more ordinary irritation of the wound; or, it may arise from the inoculation of putrid matter; or, lastly, be dependent on the introduction of a specific virus into the system. It is probable that each of the causes may exert an influence, but the worst effects of dissecting-wounds are dependent on the inoculation of a peculiar virus.

That ill effects sometimes result from the simple irritation of a puncture is evident from the fact that we see mere scratches or punctures with splinters of wood, or other harmless substances, give rise to considerable local disturbance in certain states of the constitution; so also we find that those dissecting-wounds that are ragged and torn, such as are made by spiculæ of bone, or teeth of a saw, are attended by peculiarly troublesome consequences.

Putrescent matter must always be injurious when introduced into the economy; at the same time it is a remarkable fact that the worst dissection-wounds have been received before putrefaction had commenced, and that they more frequently occur in post-mortem examinations than in dissecting-room investigations.

That the worst forms of dissecting-wounds are dependent on a specific virus, is evident from the fact that it is after death, from certain diseases, especially of an erysipelatous type, that these consequences ensue. Most dangers are to be apprehended from punctures received while dissecting the bodies of those who died of erysipelas, phlebitis, and the diffuse forms of peritonitis following parturition, or the operation for hernia. That the poisonous influence from such bodies is transmissible to others by contact or infection, can not be denied, and accoucheurs and operating surgeons should be extremely careful in performing post-mortem examinations on patients dying of such diseases, lest the poisonous influence be carried to and excite similar morbid action on their own

patients. The mere *contact* of such a body is sometimes dangerous. The poison from a subject in the dissecting-room may also affect different persons in a very dissimilar manner; thus, in one it may produce headache only; in another, diarrhœa; another, suppuration of the cellular tissue in particular parts; or it may produce a sort of maniacal delirium, typhoid fever, and other serious though perhaps not dangerous affections. From this it would appear that there are two distinct kinds of mischief resulting from these injuries.

The milder form is not of a specific character, but proceeds from the irritation of a simple scratch in a broken constitution, or from the inoculation of putrescent matter. In these cases the part punctured becomes painful, hot, and throbbing, in from twelve to twenty-four hours after the injury; the finger swells and inflames, the absorbents of the arm are perhaps affected, and the glands in the axilla become enlarged. There is a general febrile disturbance of an inflammatory character, ushered in by rigors and a feeling of depression; suppuration takes place about the puncture, and also, perhaps, in the inflamed glands—the case presenting the ordinary character of whitlow with inflammation of the absorbents.

In the more severe form of the wound, the patient is seized, about twelve or eighteen hours after the puncture, with rigors, anxiety of countenance, and depression of the nervous system; with a quick pulse, and febrile reaction of an inflammatory character. On examining the finger, a pustule, or a vesicle, with an inflamed areola, will be observed in the situation of the puncture; and from this a few red lines may be observed stretching up toward the arm-pits, with swelling and tension in this region. Diffuse inflammation of the cellular tissue sets in about the fifth or sixth day, extending up to the shoulder, and down the side of the chest. Abscesses, usually of a somewhat diffuse character, the pus being mixed with shreds and sloughs, form, often with much pain, in these situations. The general symptoms gradually assume an asthenic type; the tongue becomes brown; sordes accumulate about the lips and teeth; low delirium sets in, with a rapid, feeble pulse, and death occurs in from ten days to three weeks. When incisions are made into the brawny tissue, it is found infiltrated with sero-pus, and in a sloughy state. If the patient live, large circumscribed abscesses form under the pectorals, in the axilla, and above the clavicle, with

much exhaustion and depression of the system, convalescence being tedious and prolonged, and the constitution being often shattered for life.

It is this form of the disease that resembles diffuse inflammation of the cellular tissue arising from other causes; and there can be little doubt that it is a cellular erysipelas dependent on a toxic agency. That this form of dissecting-wound is of a truly erysipelatous character, is evident from the fact that patients affected by it will communicate fatal erysipelas to their nurses and attendants. It is also this kind of wound that is especially apt to occur after punctures received from patients who have died of diffuse inflammation of the serous membranes.

It may be remarked, as a general rule, that when dissecting wounds are inflicted by a sharp-pointed instrument producing a puncture, the danger is much greater than is to be apprehended from an incision.

Treatment.—The *prophylactic* treatment of dissecting-wounds consists in avoiding exposure by keeping the hands from coming in contact with sharp spiculæ of bone, or of being injured by the instruments employed, as well as by covering with oil, or, what is better, collodion, any abrasions or wounds which may exist. So soon, however, as a wound is observed from dissection, especially if it be a severe puncture, the patient should disregard the circumstance of his having a dainty stomach, and immediately place the injured part to his mouth and suck it.

Excision is also to be recommended in case of this accident as well as in the bite of rabid animals. The great object to be accomplished by incision is to turn the current of blood *from* the system and cause it to flow through the wound; and in this manner the virus is not only more likely to be washed away, but is at the same time prevented from entering the circulation. Bleeding, therefore, should be encouraged not only by the process of sucking, but by the application of a cupping-glass, or cloths dipped in warm water and applied to the poisoned part.

The efficacy of the *ligature* in this and similar cases is very questionable, as at the best it can act only temporarily, and after its removal absorption is permitted to go on even more rapidly than it would have done otherwise. In severe cases, also, the application of caustics, used to the extent of producing an eschar, is to be

regarded as prejudicial, as they add to the irritation and inflammation of the wound, and by forming a slough prevent the escape of noxious discharges and therefore favor their absorption.

If, however, sucking the wound, applying mild *liquid* caustics, or incising the wound so as to make it bleed freely, do not suffice to prevent the occurrence of inflammation, accompanied by swelling of a bluish appearance, together with constitutional symptoms, recourse should be had to warm poultices, and *china*, *arsenicum*, or *lachesis*, administered internally, according to the particular indications.

As the more prominent constitutional disturbances induced by the poison of the dissecting-room are manifested in the extreme exhaustion which ensues, the diet should be of the most nourishing character, though nothing of a stimulating nature should be allowed.

Hamamelis is highly recommended by Dr. T. G. Comstock, in the form of a saturated solution applied to the wound. In half a dozen cases of poisoning from dissecting-wounds, one of which was on himself, he witnessed the most beneficial results from its use.

In this connection I would advise the use of *Bibron's antidote*, as recommended on page 652, as I believe the remedy possesses great curative powers in neutralizing the poison from dead animal matter, as well as that from the living animal whose bite or sting is naturally destructive to the human system. *Calendula* is a remedy of tried efficacy in this variety of wounds.

CHAPTER IX.

GUNSHOT WOUNDS.

Among the special varieties of contused and lacerated wounds, there are none that present more of interest to the surgeon than injuries following gunshot. They include all lesions inflicted by firearms, as pistols, muskets, rifles, shotguns, carbines, cannons, shells, mortars, and rockets. Though rare in civil practice, as compared with army experience and during war, yet in this country, where the sports of the field are so common and so frequently indulged in, they occur sufficiently often to render an acquaintance

with them indispensable to the general surgeon. Occurring in all parts of the body, they may, in one case, be so slight as hardly to attract serious attention; while in another they may be so severe as to cause death on the spot, either primarily in consequence of shock or loss of blood, or secondarily from the violence of the resulting inflammation.

I propose in the present chapter rather to confine myself to such a general discussion of the subject as is required by the civil practitioner, than to enter into the minutæ of detail presented to the army surgeon. To him who proposes to understand more fully this interesting branch of surgical science, I recommend the excellent treatises of Hennen, Ballingall, Guthrie, Chisholm, and other eminent surgeons in our own country who have had unusual and abundant opportunities of studying the nature of these injuries upon the field of battle, and by whom they have been treated with all the minuteness of a specialty.

That military surgery does not differ from the surgery of civil life, is true in letter, but not in spirit. As a *science*, surgery, wherever and by whom practiced, is the same; but as an *art*, it varies according to the peculiar nature of the injuries to be treated, and with the circumstances which surround it. To the army surgeon, many accidents are presented which less frequently fall to the lot of the civil practitioner; while, on the contrary, in domestic life many cases are treated which rarely come under the charge of the military surgeon. The two classes of practitioners may be said to occupy separate departments in the same profession, which, though blending occasionally, are nevertheless somewhat distinct from each other.

The military surgeon during peace enters for a short time into civil life, but during war he is called upon to exercise the very highest functions of his profession, and has little to do with the more trivial accidents which constitute the sum of a private practitioner's daily routine. He sees less than the civilian of the modifications which are impressed upon disease by age and sex; but in war he has a wider field for noticing the influence of external circumstances, of extremes of climate, of variations of food, work, and shelter, on the same men, as well as the effects of mental causes as seen in the exultation of victory and in the prostration and dejection of defeat.

But although there exist such distinctions between the relative spheres of these two classes of surgeons, there should be nothing in the exercise of their different callings to create an antagonism between them. Members of the same honorable calling, whose office is to relieve human suffering, it is the duty of both to aggregate their respective experiences for the advancement of their common profession.

To no class of medical men is a liberal education more important than to the army surgeon. The many variations of climate through which he passes, and the delicate positions in which his service often places him, demand the possession of an enlarged and well-stored mind; while the deep responsibility attached to the charge of such a number of valuable lives, and the necessity (often imposed by the absence of a consulting surgeon) of deciding the most critical cases on his own unaided judgment, demand the firm self-reliance founded on clear knowledge, as essential to any measure of success. Even amid the falling ranks, where he is exposed to as great danger as any, he must entirely forget self and give his whole attention to the condition of the sufferers around him; for often do his own decisions, formed in an instant of time, settle the fate of the fellow-being prostrate before him. Then his powers of observing correctly must be so well trained that he can readily discriminate between different diseases, whose types are mingled and masked by their union, as are only seen in armies in time of war.

The hardships incident to a soldier's life fall equally on the surgeon and his comrades; and, besides the dangers of battle and exposure, he runs the risk of those epidemic diseases that devastate armies, and which are the product of exciting causes that threaten his own life as well as those under his charge. In civil practice, the surgeon is not subjected to the privations, fatigue, cold, want of clothing and food, that make up the sum of a soldier's calling. Besides, the lack of libraries and, too often, suitable text-books for study and reference, are drawbacks to the exercise of the profession in armies, which the civil practitioner need not lack. On the other hand, the strict discipline which prevails in army hospitals gives the military surgeon some advantages not enjoyed by the civilian in the treatment of his cases. No interference from the ill-judged kindness of relatives, or from the headstrong willfulness of the patient himself, can occur. His opinion is supreme, and his treatment

final, from which there is no appeal. He has, also, the advantage of confirming his diagnosis by an appeal to the cadaver in a post-mortem examination. He can, in general, exercise his judgment in the treatment of cases, without being subjected to the too often ignorant criticism of those whose fondness for fault-finding arises rather from a desire of self-importance than from a true knowledge of the conditions involved. How different, also, are the means of treating injuries in the field from those of civil life! The carefully-constructed hospital, the ample space, established routine, and the many comforts and appliances of a civil hospital, contrast strongly with the temporary abode, hurried and extemporized inventions, and incomplete arrangements, of a military hospital in the field. During a battle, when the wounded are brought to the Division field-hospital in large numbers, the military surgeon can not choose his own time or circumstances in performing his operations. He must be always ready for any emergency to which the duties of the service call him. His operations also differ widely from the classic proceedings of civil life. In the practice of field service, methods of operating will often succeed which are not adapted to civil practice. Thus, in the resection of joints which is performed on the field, a comparatively small and simple incision will enable the operator to remove the injured parts, which in civil practice may require a longer and more complex incision for the extraction of the enlarged and unbroken bone which has to be removed. In some fractures of bones, also, the military surgeon may amputate legitimately when the same procedure would not be considered good surgery in civil life, owing to risks incurred in transportation, want of proper materials for treatment, etc., after a reverse in the field.

All these circumstances, and a thousand others, go to make up the differences that exist between the surgeons of military and civil life. But besides all these matters, in which civil and military surgery disagree, there are other differences which have been presented to army surgeons during the recent rebellion to which I must allude as constituting the character of wounds inflicted.

A siege differs in many respects from ordinary campaigning, both in discipline and the mortality of the wounds to which it exposes the soldier. The close proximity of the opposing batteries, the steady and deadly aim which is obtained by the sharp-shooters, the point-blank range acquired by the cannoniers, and the care and absence

from all hurry in the working of the guns, contribute to render the proportion of casualties higher and their severity greater, in sieges, than the injuries which attend a campaign in the field. Wounds of the upper part of the body are more common in a siege, from the abdomen and lower extremities being protected by the works; and shell-wounds are of more frequent occurrence, from the larger amount of siege-guns and field-pieces employed in attacking or defending a city. In the severe and protracted siege of Vicksburg, where the author served in the capacity of surgeon, a greater frequency of wounds was observed in the upper part of the body, and a consequent greater mortality occurred among the wounded. The health of troops does not maintain such a high standard when they are stationary as when they are constantly on the move, undergoing the stirring incidents and changes of an active campaign; nor are those wounded during a siege so apt to recover from the injuries received. One advantage, however, presents itself during a siege, which does not accrue to a campaign in the field, and that is the condition of the hospitals. In a siege, the hospitals are stationary, are better arranged, because more time can be given to that purpose, and are so near the scene of conflict that the wounded can be more readily carried to them and the operations sooner performed.

During the recent rebellion, at the sieges of Donelson, Corinth, Arkansas Post, Vicksburg, etc., our army had not only to undergo the ordeal of great battles, but the prosecution of sieges unparalleled in the history of war—sieges in which every obstacle and trial was enhanced by the stubborn resolution and undaunted courage of a brave and determined enemy, in every respect our equals save in numbers and the general perfection in equipments and munitions of war.

Under the head of *gunshot wounds*, surgical writers generally describe all such injuries as are received in warfare, or which result in any manner from the explosion of gunpowder.

These wounds, therefore, embrace a great variety of injuries, and demand of the surgeon not only the knowledge of the principles that govern the laws of projectiles, their course and effects in the body, but also an intimate acquaintance with physiology and anatomy, in reference to the position of wounds and their effects upon the system.

1. Gunshot wounds usually present evidences of contusion and

laceration of the tissues injured; hence, more or less sloughing of their edges and track is to be looked for.

2. Immediate or primary hemorrhage is less common in gunshot wounds than in other wounds, except a *large* vessel is cut; even then it does not always bleed; "the application of a tourniquet being rarely necessary," says Guthrie.

3. Consecutive or secondary hemorrhage is very apt to take place in gunshot wounds near large arteries, from the eighth to the twentieth day after the injury.

4. Gunshot wounds generally heal by granulation; rarely, if ever, by adhesive inflammation.

5. After hemorrhage, the greatest danger from gunshot wounds is the traumatic fever that frequently attends the process of repair.

6. A certain constitutional alarm or shock follows every serious wound, the continuance of which indicates serious complications and dangerous consequences.

These rules, however, like all general laws, are liable to occasional exceptions, which do not invalidate their correctness. Thus, a wound caused by a very rapid Minie ball, in a healthy, temperate man, will sometimes heal readily, without the usual process of inflammation and suppuration.

On the other hand, the younger Larrey reports a case seen at the siege of Antwerp, where a shell passed between a man's thighs and divided both femoral arteries, without hemorrhage, though the pulsation was distinctly felt at the cardiac side of the vessels to within a few lines of their divided extremities. The speed of a ball at the moment it divides an artery also influences the result. A rapid ball cuts the vessel so as to permit instantaneous hemorrhage; whereas a slower one contuses it, so as to prevent primary, though it favors secondary, hemorrhage. The character of the wounds made by *fast* and *slow* balls, at long distances, varies much. A *round bullet*, at short range, and flying rapidly, wounds like a knife, and perforates a bone without splintering it; while a *slow* ball, at longer range, lacerates the flesh and splinters the bone. The *conical* bullet, especially from Minie rifles, having much greater velocity, cuts cleaner at short range than a round, swift bullet; while at long range it tears more than a slow, round ball. A round bullet may glance from a bone, or be split on its edge, as may happen when hitting the crest of the tibia; a conical one seldom if ever splits,

and invariably splinters the bone struck in the direction of its axis, leaving spiculæ to discharge months afterward. Macleod remarks that he never met with a case in which a conical bullet that struck perpendicularly to a bone did not comminute it extensively. The severity of gunshot wounds depends more upon the velocity of the ball than its size; hence, the conical ball, or the Minie-rifle ball, is more destructive than the round one.

Laws of Projectiles.—1. The greater the velocity, the greater the danger to life. 2. The swifter the ball, the more direct its course will be through the part; hence, the greater danger of wounds of important viscera from balls received at close quarters. 3. The slower the movement of a ball, the more apt it will be to splinter a bone when struck. 4. Free and *primary* hemorrhage is more frequent from wounds made by swift than slow balls, the latter being more frequently followed by *secondary* hemorrhage. 5. A *slow*, round ball, striking a bone without sufficient force to splinter it, is apt to be flattened upon it; while a *swift*, round ball, striking against a sharp angle of bone, will often be split into two fragments, each of which will pursue a different course.

A ball penetrating the soft tissues always produces a contused wound; and from the resistance experienced at the point of entrance, the contusion is more marked



Fig. 182.

Orifice of entrance.

than at the point of exit of the ball. The opening made by the *entrance* of a ball is more contused, and the orifice smaller, in consequence of the contraction of the surrounding structure—the latter being depressed

Fig. 183.



Orifice of exit.

from without inward, as is shown in Fig. 182; while that made by its exit is large, somewhat everted, and irregular in its appearance, as is seen in Fig. 183. It

sometimes happens, however, that there is little appreciable difference between the two, and in rare cases the aperture of entrance

is larger than that of exit. The explanation given by Mr. Guthrie, that these discrepancies depend partly on the momentum of the ball, and partly on the resistance with which it meets, is undoubtedly correct. If the ball strike shortly after its discharge, when at the maximum of its velocity, it will make but a small, round hole, separating the parts rather than dividing them. If it traverse a part composed of soft tissue, meeting with but little resistance in its progress, consequently losing but little of its momentum, and passing out of the body with nearly the same force with which it entered, it makes an aperture of exit but slightly different from that of entrance. If, however, the ball strike a dense object in its course, as bone or ligament, thus materially lessening its momentum, the aperture of exit will be large, torn, and ragged, while that of entry will be small and round. The entrance aperture in all bullet wounds is actually less in diameter than the bullet itself, if made while the ball is moving with full velocity—the aperture becoming larger and more ragged in proportion to the diminished velocity of the missile. The weight of the object which penetrates the tissue exercises considerable influence on the character of the wound. A missile of light weight, and propelled by a certain force, will cause less destruction of tissue than a more weighty one. Size and shape also exercise modifying influence on the appearance of wounds. Double bullets, linked together by a spiral coil of wire, something after the manner of chain cannon-shot, were introduced by the Russians during the Crimean war. Specimens of these bullets were found about the works around Sebastopol, but no injuries at the time were attributed to them, although after the discovery certain peculiarities in the appearance of some wounds led to the belief that they had been inflicted by the connecting shot. In the History of the Eastern Campaign, by Dr. M. Scrive, mention is made of incendiary bullets which were used by the Russians, which consisted of a small cylinder of copper, containing a quantity of detonating powder made up in the form of an ordinary cartridge, so as to be discharged from a musket. On striking the person, the projectile bursted, inflicting a great degree of violence. It was not until after the siege was concluded that these bullets became known, and it was only then, M. Scrive remarks, that a key was obtained to certain wounds of a violent and frightful character, which could not be accounted for by the action of ordinary bullets

or fragments of shell. Bullets containing poisonous materials, as well as those charged with this detonating powder, are said to have been employed by the rebels in the late war of the rebellion. As the result of such extensive lesion made by these balls, death must take place immediately, or else such violent traumatic inflammation as must necessarily lead to gangrene, oftentimes imposing upon the surgeon the necessity of amputation.

The increased force and velocity of improved modern projectiles has changed to a very great extent the character of wounds received in battle. In a table showing the velocity of certain moving bodies, the common musket-ball is set down as moving at the rate of 850 miles per hour; the rifle-ball at 1000; the 24-pound cannon-ball at 1600 miles per hour. The musket-ball could not be depended on to hit an object beyond 80 yards; the ordinary rifle, 250 yards; while the present Enfield rifle is sighted to hit an object at 900 yards, and the short Enfield at 1100 yards. The effects of these different rates of velocity are observed in the character of wounds inflicted: thus, a cannon-ball, by its weight and but slight velocity of motion, will prostrate a person without material injury; but if flying at ordinary speed, it will take off a limb without destroying the equilibrium of the body. A musket-ball that at a certain distance would be arrested before passing an inch deep into the soft tissues, only produces a lacerated wound of unimportant severity; while a conical bullet from the improved United States rifle will pass entirely through the limb. This increased velocity produces its effect in two ways: *first*, by the greater destruction of tissues in the track of the projectile; and *second*, by the greater disturbance of the nervous system. The portions of the body through which a bullet, traveling with this increased velocity, passes, are so thoroughly deprived of their vitality that instances of these wounds healing by the first intention are exceedingly rare; while examples are often mentioned by authors in which such wounds have been inflicted by the old musket-ball. The great power of resistance so often before exhibited by the firm yet yielding skin, by tendonous and other structures, avails little when struck by the bullet from improved modern firearms.

The splitting and destructive effects of conical balls on the shafts of the long bones of the extremities were abundantly demonstrated during the late war. The old round balls, from various causes—

partly from their form, partly from the imperfect mechanism of the gun itself, with the correspondingly diminished velocity—on hitting bones would either deflect in their course or break away a portion of the shaft without further injury; or, having broken through the corticular portion of the bone, would be found imbedded in its cancellated structure, or be simply flattened without penetrating. The modern conical bullets are denser, made so by mechanical pressure during their manufacture, and consequently possess greater power of penetration than the old-fashioned molded ball. This is fully demonstrated with the modern English rifles, the Enfield and Whitworth, and the American Minie, the properties and charges being of the same bore and weight. When lead is used, the penetration at 800 yards is one-third greater with the Whitworth than with the Enfield, and greater still with the Minie than with the Whitworth; but if a less yielding projectile is used (as when the lead is mixed with tin), its penetrative power is as 17 to 4 at 800 yards. The fact is patent, as abundantly proven during the late American struggle, that conical balls in action exercise overpowering force over all structures, bone, cartilage, and ligament included, greater than that of any other projectile of equal size and velocity. Bullets from the modern Minie and Enfield rifles travel with a velocity so great relatively that lodgment is rare as compared with old-fashioned firearms.

It is abundantly demonstrated, both in the records of the Surgeon-General's office and in a number of private collections gathered together during the great rebellion, that the Minie ball is rarely deflected in its passage through the body; and even though the ball be very much battered, it has been known to pass through the largest bones, and, when the momentum has been diminished, to bury itself in the cancellated bone, rather than be turned aside by the object. The conical ball appears to pass into the structures with both an onward and a spiral motion, causing thereby great destruction and extensive comminution of the bony structure, as well as laceration and destruction of the soft tissues.

Course of balls.—The course of gunshot wounds is exceedingly variable, and can never be pointed out with any degree of accuracy before exploration. A case is cited by Henner, in which a ball entered at the pomum adami, making a complete circuit of the neck, and being found at the point of entrance. Armand relates

a case of a captain in the Crimean war who was struck by a ball in the shoulder, which, being deflected by the scapula, traversed the whole length of the vertebral column, and was cut out in the loins. I treated a case in the U. S. Mound City Hospital, where a soldier at the siege of Fort Donelson received a ball at the back part of the neck, on the right side of the ligamentum nuche, which traversed the whole length of the spine, and made its exit from the nates. During the inflammatory period, the track of the ball became distinctly visible by a well-defined reddish line. The same ball may sometimes inflict several wounds. Dr. Canniff * mentions a case of "a private in one of the New Jersey regiments who had been wounded in the right arm while in the act of putting a cartridge into his musket. The ball had completely cut off his forefinger, then passed directly through the body of the hand, and, again entering the back of the arm about two inches above the wrist, had ploughed a furrow for a few inches, and then entered into the deeper part of the arm, and finally made its exit and escaped a little above the external condyle of the humerus."

During my time of service in the army, I witnessed many interesting evidences of the strange and anomalous course of balls in various parts of the body. In one case the bullet passed over more than two-thirds the circuit of the neck, and was cut out just beneath the skin. In another, a ball entered at the crest of the ilium, passed downward parallel with the thigh, and emerged just above the knee-joint. A case is mentioned wherein a desperate lover attempted suicide with a loaded pistol, the muzzle placed in immediate contact with the heart. The ball in its flight struck the flat surface of a rib, deflected toward the spine, passed downward, and was taken out at the buttocks. Balls frequently remain in the body for a long time, sometimes for life, without occasioning much inconvenience, lying imbedded in the substance of a muscle or in the layers of its aponeurosis; it becomes incased within a fibrinous sheath, and, the parts becoming accustomed to its presence, little or no damage is done to the system. But when it lies in the course of a considerable nerve, its pressure upon it may occasion paralysis. A most interesting case of this nature occurred in my practice about one year ago, in which a bullet was driven into the

* Principles of Surgery, by Dr. William Canniff.

upper part of the thigh, all efforts for its removal being unavailing. The wound healed, and the patient attended to his ordinary duties as if nothing had happened, when suddenly (four years after the injury) he was attacked with a loss of motion in the leg. Having placed himself under the care of a surgeon, and getting no better, at the end of five weeks the case was submitted to my care. Upon examination, I discovered the cause of the difficulty, and, learning the position when struck, examined carefully the inner and upper part of the thigh, where I felt the ball lying in contact with the crural nerve. The ball was removed, the patient improved in strength, and in a short time fully recovered the use of his limb, and up to this time enjoys uninterrupted health.

Macleod mentions a case where a piece of shell weighing three pounds remained in the body for two months, only creating a small fistula. Hennen cites the case of a young officer who was wounded by a twelve-pound ball at the Alma, which remained for some time unobserved in his thigh. After the siege of Fort Donelson, among the wounded sent to the Mound City Hospital was a private in one of the Illinois regiments who was struck by a *six*-pound rifle-shot in the fleshy part of the thigh. The wound appeared considerably lacerated, but the fact of the object concealed within had escaped the knowledge of the surgeons in attendance, probably on account of the large numbers of wounded requiring surgical aid; and not until the second day's entrance into hospital was the ball discovered and removed.* Larrey narrates a case, also, in which he extracted a ball weighing *five* pounds from the thigh of a soldier who had suffered so little inconvenience from it that it had been, as in the preceding case, entirely overlooked by the surgical attendant.

Persons are occasionally killed with *wadding* discharged from an ordinary fowling-piece. An instance of this character occurred in one of our leading theaters a few years since, where a man lost his life from this cause in a sham fight upon the stage. The wadding, which was a common cartridge, struck the side of the head, fracturing the temporal bone, and, passing across the brain, lodged against the falx of the dura mater, from which it was extracted by Dr. John Rhea Barton, after death, which happened one hour after the accident. In 1838, a girl was killed in England by the dis-

* This ball is among the specimens preserved in my private museum.

charge of a gun loaded with paper pellets, some of which penetrated the body and lodged in the lungs and liver. A case is recorded of a man being fatally wounded by a kid glove, fired from a blunderbuss. The glove entered the cavity of the abdomen, the person standing ten feet off, and was there found after death.

Small shot frequently inflict serious injuries, according to the proximity of the person to the gun. If a person be within a few feet of the muzzle, a terribly torn and lacerated wound will be made; while if the person is at a greater distance, a less serious injury will be inflicted, the danger depending upon the distance the person is removed from the weapon. A single shot fired at a considerable distance may, by penetrating an important organ, cause serious and even fatal results. Thus, a shot entering the globe of the eye may destroy vision, or, lodging in the heart, occasion death. The celebrated prize-fighter, Bill Pool, of New York, received a pistol bullet in the fleshy portion of the heart, and lived several days after the injury, but finally died of its effects.

Splinters of various kinds, of wood, stone, or metal, propelled by the explosive force of gunpowder, as in mining and blasting operations, inflict the most terrible forms of injury. In naval actions, the force with which splinters of wood and metal are driven, when struck and scattered by cannon-shot, is so great as to inflict the most serious and fatal mischief.

Slugs and *grape-shot* occasion severe and serious wounds, by lacerating the soft parts, fracturing and crushing bones, tearing asunder vessels and nerves, perforating the intestines, cutting off extremities, and in fact inflicting every possible variety and severity of injury.

Cannon-balls inflict injuries in two ways: *First*, they may contuse a part without destroying the integrity of the skin, the ball striking obliquely or rolling over the surface of the body, completely pulfeying muscles, lacerating vessels and nerves, laying open large joints, and literally mashing the bones; and yet, perhaps, owing to the elasticity of the skin, hardly bruising it, much less producing any serious wound. By the older writers, these injuries were erroneously attributed to the windage of balls, or the action of the current of air set in motion by the projectile. *Second*, cannon-balls, when coming in contact with a limb or portion of the body, more commonly carry away the whole thickness of a part,

tearing and shattering it, and inflicting the most fearful injuries. It has been already shown that a ball in rapid motion will, on reaching the body, pass through it in a straight line; or that, instead of this, if it be large, as in the case of a cannon-ball, it will carry away the part completely. But when projected lazily, it will, as before mentioned, inflict the most frightful injury without leaving hardly a trace upon the skin. That this so-called *windage* of balls is purely hypothetical, is manifest from the fact that during the different naval and military conflicts of the late rebellion, pieces of dress, accoutrements, buttons, etc., and even portions of the body have been carried away by shot in rapid motion without any serious injury done to the tissues lying beneath. An instance of this kind was witnessed by the author in the naval and land attack on Haines' Bluff, in 1863. Captain Gwyn, commander of the gunboat *Benton*, while engaging the enemy's batteries, received a wound from a cannon-ball which struck the chest obliquely and passed on between it and the arm, carrying away the soft structures and exposing the ribs. This gallant and meritorious officer lived several days after the injury, and died from the secondary or remote effects of the wound.

Symptoms.—The symptoms of gunshot wounds resolve themselves into two kinds, *local* and *general*—into such as are peculiar to the *part* and to the *general system*. The *local symptoms* resemble in a great degree those which have been spoken of in connection with lacerated and contused wounds. The characteristics are, generally, much tearing of the tissues, and very often considerable laceration of the soft structures. The conical ball, especially, plunging through and dividing the tissues, is more destructive to life than the round ball, which is much more readily deflected, as it passes through with considerable less velocity.

Pain.—Pain consequent upon gunshot wounds may be almost or altogether absent; the person, although perhaps severely hurt, not being conscious of having received any injury until several minutes after it has been inflicted. It is characteristic of these wounds that the amount of pain does not depend on the degree of violence done to the muscular and vascular systems, but rather upon the constitutional peculiarities operating within the system. I have often seen soldiers wounded in different portions of the body unconscious of such injury, still fighting on as if no wound had been received, only

ascertaining the dread reality either when overcome by the loss of blood or when attention was called to their condition by a comrade. Wrought up to the highest pitch of excitement by the continuous din of battle, one moves forward thoughtless of danger and fearless of death, perhaps with a dangerous wound, still unconscious of the injury sustained; while another falters and falls with hardly a scratch on his person. A remarkable instance of the latter occurred—showing the impressive peculiarities of individuals—during the charge at Chickasaw Bayou, in December, 1862, when a young officer on General Blair's staff was carried to the rear, in consequence of a severe wound alleged to have been inflicted in the leg. Arriving at the Brigade field-hospital, under my charge, and laid upon a mattress, an attendant was ordered to strip off his boots, pantaloons, etc.; this being done, immediate search was made for the wound, but no abrasion of the skin appeared in any part of the body of this gallant officer. Encouraged by the assurance that no harm had happened, he immediately rose to his feet, and, mounting his steed, rode away toward the front. When pain attends a gunshot wound, it is usually of a dead and heavy character, differing essentially from the pain which follows an incised or punctured wound. It is only when a considerable nerve is divided, or partially cut, that it is severe; and then it assumes a sharp, pricking character, followed by numbness, and perhaps paralysis, of that portion supplied by the nerve. Thus, in gunshot wounds of the thigh, involving division of the sciatic nerve, there is loss of both motion and sensation of the distal parts, attended with coldness of the limb. This pain, although slight at the reception of the injury, becomes intensely aggravated after the inflammatory process has set in.

Hemorrhage, as a general thing, in these wounds, is not excessive, nor at all in proportion to the severity of the injury, owing, as is commonly supposed, to the lacerated and bruised condition of the structures. The tissues immediately connected with the track of the ball are usually so much condensed as not to permit the flow of blood, except, perchance, a large vessel is divided by the bullet. If a large artery is partially divided, bleeding is more likely to occur than when it is cut entirely across, as the vessel is prevented from retracting within the tissues. In such a case, the blood will flow freely; and although it may be temporarily arrested by the clot which forms during syncope, the moment reaction takes place

the clot will be washed away, hemorrhage again recur, and thus the case may go on, fainting and reaction recurring in turn, until life is extinct from loss of blood. When the vessel is entirely cut across little or no hemorrhage occurs until either reaction of the system takes place, or it is produced by separation of the sloughs that occur in the after-treatment. But while *primary* hemorrhage, as a rule, is not common, *secondary* hemorrhage is very prone to occur. The lacerated and contused state of the structures involved in the injury is conducive to inflammation and its consequences, which result in the process of ulceration. This leads to the opening of vessels lying within the terminus of the inflammatory process, and bleeding is the result. The ball in its passage impinges on the coats of vessels lying in its track, affecting their integrity; and the subsequent process of ulceration sequesters the injured portion, thereby opening the arterial tube, and hemorrhage is the consequence. A period of great danger in these wounds is when the sloughs begin to separate, which lasts from the *twelfth* to the *twentieth* day; up to this time it is often impossible to ascertain the precise extent of the disorganization. After this period, the patient, if his limb be saved, may have to undergo long and tedious processes of exfoliation of dead bone, and run the risks of intercurrent attacks of erysipelas, hospital gangrene, and visceral complications.

Constitutional Symptoms.—The symptoms by which the system is more directly involved in the lesion are subject to much diversity. The first is the well-marked shock, which is sometimes so slight that a person struck with a ball is not aware of the fact until weakness, helplessness, or loss of blood, make him acquainted with it; while in others it is altogether disproportionate to the violence of the injury, the stoutest and most courageous person often swooning away from the most insignificant wound. Whatever may be the cause of this great disparity in the *morale* of the soldier, and its consequent effect upon the prognosis of the case, it is none the less true that many live, upon whom the most severe injuries have been inflicted, while others die with comparatively slight and unimportant wounds. Temperament and idiosyncrasy exercise, no doubt, great weight in the production of these phenomena, and should modify in a great degree the prognosis in the case. It is said that veterans upon the field of battle, other things being equal, suffer much less apprehension and alarm from their injuries than new and inexpe-

rienced troops. This is not verified according to my own observations in the army; for in the attack at the Chickasaw Bayou, when General Blair's brigade, with which I was associated as medical officer, was ordered to lead the charge, although it was almost entirely composed of green troops, and the slaughter immense, as a general rule those wounded did as well as the oldest veterans or regulars in the service.

Other constitutional symptoms will supervene during the treatment of gunshot wounds, which are due to loss of blood, exhausting discharges, local irritation, want of rest, or imperfect diet and nursing. Besides these, *pyemia* may be added as a dangerous and oftentimes fatal complication.

Prognosis. — The prognosis of gunshot wounds should be made with extreme caution and judgment, more especially when the shock is severe or there is reason to fear that deep-seated parts are involved whereby serious constitutional complications may supervene. The temperament and idiosyncrasy of the patient should also enter into account before passing final judgment upon the termination of the case.

Treatment. — In the treatment of gunshot wounds, five distinct indications are presented: 1st, to overcome shock and bring about reaction; 2d, to arrest hemorrhage; 3d, to extract the ball and any other foreign matters carried along with it; 4th, to remove any loose or detached spiculæ of bone; and 5th, to limit the subsequent inflammation.

Shock. — After having relieved shock by the employment of those agents which tend to bring about reaction, such as placing the patient in the recumbent position, dashing cold water upon the face, applying *ammonia* to the nose, and the internal administration of *arnica*, with stimulants, etc., etc., as recommended under the head of Concussion, attention should then be given to examination of the wound. If internal hemorrhage take place, great caution should be used in bringing about reaction too suddenly, lest the formation of clot in the wounded artery be prevented by the increased flow of blood through the vessel. In such a case, the patient should be laid upon his back, all stimulants should be interdicted, and *erigeron* or *hamamelis* be employed internally, if the patient is able to swallow; if not, they may be used in the form of an injection thrown into the rectum.

Hemorrhage.—If the bleeding take place from the capillaries, or be caused by the division of small vessels, it will be inconsiderable, and cease of its own accord, or simply by the elevation of the part if it is an extremity, or perhaps by the use of cold water or medicated lotions of *hypericum*, *hamamelis*, *erigeron*, and *momordica*, as recommended under the head of Hemorrhage, page 158. If it be venous, moderate compression will be sufficient to arrest it; but if a large vessel is injured, the loss of blood will rapidly prove fatal unless prevented. If the vessel is superficial and the wound large enough to permit the ligature of the artery, it is a simple matter to stop it; but when the vessel lies deep in the tissues, and the opening is small, it is necessary either to dilate the wound, so as to expose the artery and tie it at *both ends*, or, where this is impracticable from various causes, to cut down upon and tie the vessel at the most convenient point on its cardiac side, as is done in the operation for aneurism. This procedure should never be done only as a last resort, and when it becomes absolutely imperative to stop the bleeding, all efforts in the direction of tying the vessel in the wound having been fruitless. Under the most favorable circumstances from this operation, the hemorrhage is exceedingly liable to be kept up by the recurrent circulation; hence, it is *always* preferable, if possible, to tie the bleeding vessel *in the wound*—and the sooner after reaction the better. If the surgeon wait until inflammation sets in, much embarrassment oftentimes ensues both in exposing the vessel and maintaining the grasp of the ligature upon the softened and partially-disorganized tissues. If the hemorrhage has been very profuse, but has gradually or suddenly stopped, either by partial syncope or otherwise, it will not be safe to leave the case to the efforts of nature; because when reaction comes on, the clot will be washed away by the increasing tide of pulsation, and hemorrhage again recur. I have seen a number of cases of this kind, during the war, and in every instance the person either died from complete exhaustion, or ligation of the vessel was required. So that, as a rule in such cases, whatever is to be done should be done promptly and effectually.

Extraction of foreign matter.—The next point to be attended to is the *extraction of all foreign substances*, such as balls, slugs, splinters of bone, wadding, pieces of clothing, etc., etc., that have been carried in with the ball or other missile inflicting the injury.

These will generally be found near the aperture of exit; but, wherever found, they should be removed before active search is made for the ball. Before commencing to explore the track of a ball, the patient should be placed, so far as it can be known, in the position in which he was at the time of receiving the injury. This is the more necessary because, as before remarked, the missile often pursues a very different route from what might be supposed by merely looking at the orifice of entrance; the slightest resistance may change its direction and deflect its course so as to lodge it in a position widely removed from a straight line. The ball will sometimes be found buried in the bony structure, in which case all efforts to remove it may be unavailing; and occasionally it will remain in this position without producing any bad effects. Should inflammation and suppuration follow, then it will be detached from its firm position, and its extraction will become an easy matter.

Splinters of bone require especial attention. Those that are quite loose and carried away from the shaft must be removed, as they will necrose and produce the same irritation that other foreign bodies would. If splinters are still adherent to soft parts, though detached for a considerable distance from the bone, they should also be taken away; but if they are still attached to the shaft, although only for a small distance, they should not be removed, as they tend to consolidate and become developed in the subsequent process of repair, and thus add to the strength of the limb.

In searching for balls and other foreign bodies, it is recommended that the wound be not unnecessarily probed, as irritation and inflammation of the tissues will almost certainly follow undue manipulation. In some cases, especially where a wound is made by a large ball, the finger becomes the best probe; and during the late rebellion it was more frequently used than the ordinary instrument for that purpose. Dr. Longmore* recommends the finger as preferable to the probe; but the latter, if employed gently and placed in the hands of experts or those familiar with its use, can not be productive of much irritation. The best kind of probe for the purpose is one from ten to twelve inches long, made of silver, as thick as a medium-sized bougie, slightly flexible and probe-pointed. When this instrument can not be procured, a female sound, catheter, or

* Longmore's System of Surgery.

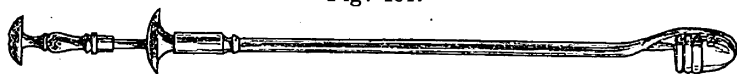
bougie, may be advantageously substituted. Before searching for a ball in the wound, careful examination must be made with the hope of detecting it in some subcutaneous position; and, if found, it should be promptly removed by a direct incision upon it. When the ball can not be found, and evidence points to its being retained within the body, the surgeon should employ all efforts to remove it consistent with reason and judgment. Protracted and violent efforts can not be advocated under any circumstances; it is better that the ball be permitted to remain, in the hope that it may become encysted, or that it will be detached and washed away by the discharges.

In a number of patients that came under my charge during my term of service in the army, I can unhesitatingly affirm that pyemia was often caused by prolonged and officious searches for the discovery of balls. After every justifiable effort has been unsuccessfully made to ascertain the position and removal of the ball, it is better that it be left alone. If it has not been roughened or jagged by contact with some dense structure, it may become encysted, producing little or no injury to the parts with which it lies in apposition. If, on the contrary, it becomes rough, jagged, and flattened, it can never become encysted, but will keep up a continued irritation as long as it remains. The great importance of extracting balls, if possible, has been placed in a forcible light by the observations of Mons. Hutin, chief surgeon of the Hotel des Invalides, of Paris. He says, of four thousand soldiers examined for gunshot wounds, within the space of five years, only twelve were reported as suffering no inconvenience, while in two hundred the wounds continued to open and close until the bullet was extracted.

Another reason for the early extraction of balls is that persons when just wounded more readily submit to the necessary operation of probing, the dread of the exploration increasing proportionally as they recover from the effects of the injury. If a ball has entered a movable joint, and lies loose within its cavity, or projects into it, it should be promptly removed; if it has been driven into adjoining bony structure, it must be allowed to remain, either to be covered with plastic material and thus to become comparatively harmless, or to be removed by the slow process of inflammation and suppuration. If it enters one of the great cavities of the body, a manipulation is entirely discountenanced. In making the search for balls,

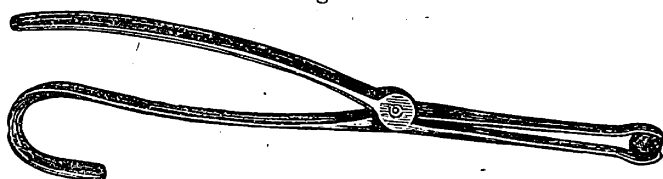
it should be done, if possible, during the natural anæsthesia caused by the shock of injury. If the patient is not seen until reaction has set in, and especially if the finger is to be employed in the search, it is better that he be placed under the influence of an anæsthetic during the manipulation. The best instruments now in use for the removal of bullets and foreign bodies are represented by Figs. 184, 185, and 186.

Fig. 184.



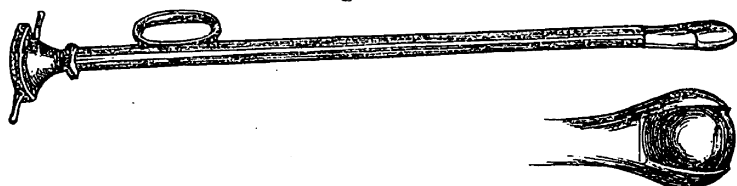
Bullet-forceps; ball in position.

Fig. 185.



Bullet-forceps; in the act of removing the foreign body.

Fig. 186.



Kolbe's bullet-extractors.

When grains of *powder* are driven into the skin, they should be removed grain by grain by a cataract-needle, or tenotomy-knife, regardless of the pain inflicted. If permitted to remain, inflammation will be excited more or less difficult to control, besides causing disagreeable and permanent disfigurement by the bluish spots left behind.

After removing all foreign substances from the wound, the next indication is to limit and circumscribe the resulting *inflammation*. Thus, if a person is shot through the fleshy part of a limb, no bone or vessel of importance being injured, the limb should be placed in an easy position and covered with cloths saturated in *arnica* lotion. If the venous hemorrhage be somewhat considerable, the limb should

be elevated; and if the bleeding is not arrested by this means, a compress may be placed over the wound. If the hemorrhage be arterial, either passing away in a jet or by rapid dripping, a tourniquet must be applied, with just enough force to moderate the flow through the artery, rather than stop the tide of blood altogether. If a limb be torn away or terribly lacerated, the tourniquet may be applied with more firmness; and the wound, if before suppuration begins, should be covered with the *arnicated* dressings. The pressure of the tourniquet will not only arrest hemorrhage, but will prevent the spasmodic quiverings of the muscles of the torn limb, which are so painful to the sufferer. An excellent plan, if it can be adopted, consists in applying a roller from the extremity of the limb to some distance beyond the wound, care being taken to leave it open at the orifice or orifices in order to permit free discharge of the fluids, and then covering the part with the arnicated lotion, as before recommended. By this process, inflammation will be moderated, infiltration into the tissues prevented, suffering abated, and the patient will generally make a quicker recovery. The practice of applying adhesive plaster over gunshot wounds is positively injurious, as it retains the discharges, and consequently aggravates the existing trouble. The use of cold dressings is borne better in summer than in winter, in young and robust persons than in the old and infirm. If its use is contra-indicated in consequence of the state of the weather or the intolerance of the patient, the arnicated dressings may be used, slightly warmed. When suppuration sets in and the local inflammation is severe, *calendula* dressings, either warm or cold, must be substituted for the *arnicated*; or, what I have used with excellent results, is a mixture of *aconite* and *calendula*, one-third of the former to two-thirds of the latter, in ten times its quantity of water. If the inflammation assume an erysipelatous aspect, *belladonna* or *rhhus* lotions should take the place of the former, with the internal use of those remedies mentioned under the head of Erysipelas. If swelling in the part take place, accompanied with pain and tension, indicating the existence of matter within, free incisions and sometimes counter-openings must be made, to drain the parts of the fluids burrowing and destroying the connective tissues.

At the period of loosening and separation of the sloughs, there is always especial danger of the supervention of consecutive

hemorrhage. At this period the patient requires to be carefully watched; and if the wound be in the neighborhood of large vessels, a tourniquet should be placed loosely about the limb, so as to be tightened at a moment's notice. The artery should now be ligated in the wound, if possible; if not, in the most convenient situation above it. If this does not arrest it, and all means fail in preventing hemorrhage, amputation is the last resource, but should never be done until all other justifiable means have been fruitlessly resorted to. After-consequences of a serious nature, such as fistulæ, abscess, profuse discharges, necrosis, and the separation of splinters of bone, may be looked for in many cases, which may be kept up for a long series of years. Thus, General Bem had a bullet removed, by Liston, from the external condyle of his femur, nineteen years after its lodgment in that bone; and Marshal Moncey's death was caused by the effects of a gunshot wound inflicted forty years before.

Combined with these local means, due attention must be paid to all constitutional symptoms as they occur.

Aconite—If the subsequent fever be high and assuming a sthenic type, with full, hard, and bounding pulse, dry and hot skin, coated tongue, restlessness, and thirst. In this variety of wounds, it takes the place of both local and general bleeding—so much vaunted by allopathic authority in the case of young and plethoric subjects—without any of the disadvantages of the latter, curing the inflammation, as Tanner remarks, “without going out of our way to produce debility, and thus favor the occurrence of toxicæmia.”

Arnica.—The effects of this drug are most marked in those cases where there is a tendency to great depression, even to extinction of the vital powers. It is specifically indicated in the contusions and lacerations that follow gunshot wounds; acting powerfully on the vegetative sphere, it stimulates the absorbent power of the capillaries, especially when weakened or even suspended by external injuries. By virtue of this action it is an important agent in all inflammations that are the result of blows, contusions, wounds, sanguineous extravasation, and injuries of all kinds. In the traumatic fever that follows injuries of a violent character, *arnica* is, however, inferior to the preceding remedy.

Calendula officinalis.—This is *par excellence* the most valuable remedy now known for the treatment of suppurating surfaces, ulcerations, etc., following gunshot wounds. It exercises a profound

curative impression upon the diseased tissues, prevents disintegration and ulceration, and assists in expediting the process of granulation and cicatrization. In a large number of amputations and resections I have employed it with the most satisfactory results, and in a few instances perfect union of the cut surfaces was effected with the least possible suppuration. In some of the most frightfully lacerated wounds its action was prompt and beneficial, suppuration diminishing and incarnation taking place most rapidly—strikingly in contrast with the extensive suppuration and slow curative process of allopathic medication. It is the best *vulneraria* in use, and should be administered internally as well as externally, and continued until complete cicatrization has taken place.

Hypericum perf.—This is another valuable remedy in the treatment of gunshot wounds, and is particularly called for when the parts have been lacerated and torn, with engorgement of the capillaries, attended with more or less discharge of bloody matter. It stands in the same relation to laceration of the tissues as *arnica* does to their contusion, and is, in the opinion of the author, destined at no distant day to become one of the most important remedies in the homœopathic school for injured and lacerated tissues.

Gelseminum.—Though a remedy of decided curative powers in inflammatory affections, it is inferior to aconite as a remedy in purely inflammatory diseases, but is extremely valuable in “irritative fevers,” so called. It corresponds with the nervous irritation, the tendency to irregular convulsive movement, the periods of wakeful debility, and the accessions of feverish stupor. It is on this account competent to relieve the irritative fever that accompanies suppuration in gunshot wounds of any considerable magnitude. I used this remedy quite extensively, in the various hospitals under my charge during the rebellion, in gunshot wounds attended with suppuration, irritative fever, etc., etc., and recommend it as a remedy of more than ordinary efficacy.

Veratrum viride.—When pulmonary and cerebral complications of a sthenic grade arise, this remedy, in controlling the action of the heart and modifying the excitement in the nerve centers, is of considerable power. I have used it with the most excellent results in gunshot wounds of the lung. For a more extended consideration of this remedy, turn to page 232 *et sequitur*.

Belladonna is especially valuable in a tendency to congestion

in persons of a plethoric nature, and seems to act *primarily* upon the cerebro-spinal system of nerves, and *secondarily* upon the vascular apparatus. In typhoid fever following gunshot wounds, and in the erysipelatous inflammation that sometimes follows, it is a remedy of great curative power. Also, in delirium and in subacute inflammation of the brain and its membranes, it is indispensable. See Belladonna, page 236.

Baptisia, bryonia, arsenicum, chininum, are of importance in the treatment of wounds of this class, according to their indications, which see under the head of Inflammation and its Treatment, page 238.

Mercurius is beneficial in chronic abscesses which are slow in culminating; and also in suppuration when it proceeds slowly, accompanied with painful exacerbations at night and which become almost insupportable.

Calcarea, calendula, and silicea, are useful during the suppurative stage, and when the inflammatory excitement has been subdued by appropriate medication; and for the purpose of promoting granulation and cicatrization in persons whose constitutions have become weak, debilitated, and cachectic, from long-continued suppuration; and when the granulations are irritable, and disposed to bleed at the slightest touch.

If *gangrene* threaten, the remedies best adapted to overcome the disease and restore the parts to a condition of health are, *ars.*, *lach.*, *carbo. veg.*, *china*, and *secale*, according to their indications, as described under the head of Constitutional Treatment of Inflammatory Products and Consequences, page 274.

It is absolutely necessary that the local applications as recommended be sedulously applied during the constitutional treatment, and, what is of the greatest benefit in these cases, is to pay particular attention both to dietetic and hygienic treatment throughout the course of the disorder.

Surgical interference.—The cases of gunshot injury that require surgical interference are similar in their nature to those of contused wounds generally, in which the same operation is necessary; and the surgeon must exercise the same amount of skill and judgment in preserving rather than condemning a part too hastily for amputation; for a part that looks much shattered and injured when covered with coagula, blood, and dirt, presents a very different

appearance after the fracture has been reduced, splinters of bone removed, and the soft parts carefully coaptated. The golden maxim of Guthrie, whose extensive experience and manifold advantages entitle his opinion to the highest respect, is, that the "amputation of a limb is the last resource and the approbrium of surgery, as death is of the practice of medicine."

Surgical interference becomes necessary in many cases, however, that do not require the amputation of a limb, but rather the removal of a part of the osseous structure injured. This procedure is modified according to the region that is the seat of injury, and will be more particularly pointed out under the head of resections and other operative processes that justly belong to that department of surgery. My purpose here is to show those important principles in connection with surgical interference in gunshot wounds, so far as they are derived from the Records of the Rebellion, and published in Circular No. 6, under the authority of the Surgeon-General of the Department, viz: *Gunshot Wounds of the Head, Face, Neck, Spine, Chest, Abdomen, and Extremities.*

Without reference to the medical treatment recommended in these statistics, which in many cases seems crude, unreliable, and entirely inconsistent with progress in medicine, as compared with modern achievements in surgery, there is nevertheless much valuable information and instruction to be acquired by the student and practitioner of medicine. From a varied and extensive experience and close observation in the treatment of gunshot wounds during my connection with the army, I am fully convinced that the per centage of mortality would have been considerably reduced if homœopathy had been admitted into the army and navy upon equal footing with allopathy. To illustrate more fully the force of this conviction, I may state that an entire ward of thirty beds in the U. S. Mound City General Hospital was set aside for the homœopathic treatment of such cases as were declared by consultation of my assistant surgeons to be beyond the hope of recovery. This ward I took charge of, assisted by two other physicians of the same school as myself, viz: Drs. Pratt and Wales; and as the result of our practice, *more than thirty per cent. of the patients, given up by allopathic medicine as hopelessly lost*, entirely recovered under the homœopathic treatment. The experiences of Surgeons G. S. Beebe, of Chicago, J. C. Morgan, of Philadelphia, T. S. Verdi, Hartshorne, Vontagen,

and others, to whom was permitted abundant opportunities for comparing the two systems of practice while in the army, fully and entirely confirm the observations just made of the superior efficacy of homœopathy as applied to army practice. I could name scores of others who have in the same manner demonstrated the advantages of the new over the old school of medicine, among whom I may mention Drs. G. S. Foster, Alleghany City, Pa.; E. Owens, Cincinnati, O.; W. D. Foster, Hannibal, Mo.; H. K. Bennett, White Hall, N. Y.; C. Judson Hill, Utica, N. Y.; and L. M. Willis, of East Boston, Mass., who served with distinction and honor in the war of the rebellion. The statistics of the success of homœopathic practice in army hospitals is shown in the following table, transcribed from the records of the institution while under my charge:

*Report of Number of Wounded and Sick treated in the United States Hospital,
Mound City, Illinois.*

MONTHS.	REMAINING LAST REPORT.			Taken sick during month.....	Aggregate.	Returned to duty...	On furlough.....	Discharged.....	Deserted.....	Sent to other hospi- tals.....	Died.....	REMAINING.		
	Sick.....	Convalescent.	Total.....									Sick.....	Convalescent.	Total.....
November.....	115	80	195	341	536	137	45	8	...	...	40	246	60	306
December.....	246	60	306	216	522	156	2	3	...	...	30	211	120	331
January, 1862...	211	120	331	183	514	248	3	3	2	...	42	166	50	216
February, "	166	50	216	1487	1703	450	75	53	...	775	49	275	26	301
March, "	275	26	301	1344	1645	225	196	51	...	816	137	208	12	220
April, "	208	12	220	1241	1461	280	580	12	...	267	130	252	40	292
May, "	252	40	292	92	384	27	99	8	...	...	43	83	24	107
June, "	83	24	107	254	361	105	15	20	...	...	15	166	40	206
July, "	166	40	206	212	418	102	5	7	1	139	14	84	66	150
August, "	84	66	150	625	775	193	.....	26	1	.....	17	459	78	538
September, "	459	78	538	1072	1609	484	2	73	...	...	38	1013	84	1097
October, "	1013	84	1097	1011	2108	886	7	21	...	227	57	910	.....	910
November, "	910	.....	910	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	4188	680	4868	8078	12036	3293	1029	285	4	2224	612	4073	600	4673

By a reference to the figures, it will be seen that the proportion of deaths to the number treated in hospital for the fourteen months under my charge—including the severely wounded and mutilated from the battle-fields of Belmont, Donelson, Shiloh, and Hatchie, and the sick from the several divisions of the army, including the command of General Curtis (wayworn, dispirited, and prostrated

by their lengthened march through Missouri and Arkansas), the wounded and scalded seamen from the *Essex* and other gunboats during this period—was only a fraction over $7\frac{1}{2}$ per cent., a lower rate of mortality, *ceteris paribus*, than is presented by the statistics of any other military hospital in the service.

The allopathic military hospitals in St. Louis, whose records are here presented for comparison, were in all respects better provided for in the variety and fitness of dietetic preparations for the sick; better provided for with hospital attendants, nurses, etc., etc.; better provided for in the choice and selection of medical assistants, and, in fact, in all things that make up the management of a hospital. The wounded received in these hospitals were not as severely injured as those forwarded to the hospitals nearest the scenes of battle; for in a number of instances the convalescent and those slightly wounded were ordered to be taken from the hospital of Mound City to St. Louis and other places, that their beds might be occupied by the wounded in other battles as they took place in the order named. Let us compare statistics:

City General Hospital, corner of Fifth and Chestnut streets — Surgeon J. T. HODGEN, U. S. V., in charge.

Whole number of patients treated.....	6,391
“ “ “ returned to duty.....	1,981
“ “ “ discharged from service.....	886
“ “ “ furloughed.....	572
“ “ “ transferred.....	529
“ “ “ deserted.....	77
“ “ “ remaining	282
“ “ “ died	925
Per centage of deaths.....	14 $\frac{1}{2}$

Good Samaritan Hospital — Surgeon W. DICKINSON, U. S. V., in charge.

Whole number of patients treated.....	2,127
“ “ “ returned to duty.....	1,123
“ “ “ discharged from service.....	260
“ “ “ furloughed.....	93
“ “ “ transferred.....	387
“ “ “ deserted.....	16
“ “ “ died.....	248
Per centage of deaths.....	12 4-10

Jefferson Barracks Hospital — Surgeon J. F. RANDOLPH, U. S. A., in charge.

Whole number of patients treated.....	6,412
“ “ “ returned to duty.....	2,061

Whole number of patients discharged from service.....	1,841
“ “ “ transferred.....	389
“ “ “ furloughed.....	923
“ “ “ deserted.....	91
“ “ “ joined invalid corps.....	142
“ “ “ remaining	226
“ “ “ died	739
Per centage of deaths.....	11½

Lawson Hospital — Surgeon C. T. ALEXANDER, U. S. A., in charge.

Whole number of patients received.....	809
“ “ “ returned to duty	31
“ “ “ discharged from service.....	114
“ “ “ transferred	24
“ “ “ furloughed.....	42
“ “ “ remaining.....	418
“ “ “ died	209
Per centage of deaths.....	25 9-10

Military Prison Hospital — Surgeon G. H. HOOD, U. S. V., in charge.

Whole number of patients treated.....	1,562
“ “ “ remaining in hospital.....	135
“ “ “ died.....	231
Per centage of deaths.....	14 7-10

Other military hospitals in St. Louis, viz: the New House of Refuge Hospital, and Benton Barracks Hospital, did not enter so largely into the treatment of wounded; hence, the comparison between them would not be analogous to the subject matter of this report. The latter hospital was more particularly designed as a convalescent hospital. Their relative per centage of deaths was $6\frac{1}{2}$ and $4\frac{1}{8}$ —quite low, indeed, as compared with similar institutions in other parts of the country.

RECAPITULATION.

Mound City General Hospital.—(Homœopathic.)

Whole number of patients received.....	8,078
Per centage of deaths, 7 9-10 (fraction over).	

City General Hospital.—(Allopathic.)

Whole number of patients received.....	6,391
Per centage of deaths, 14 5-10.	

Good Samaritan Hospital.—(Allopathic.)

Whole number of patients received.....	2,127
Per centage of deaths, 12 4-10.	

Jefferson Barracks Hospital.—(Allopathic.)

Whole number of patients received.....6,412
 Per centage of deaths, 11 5-10.

Lawson Hospital.—(Allopathic.)

Whole number of patients received.....809
 Per centage of deaths, 25 9-10.

Military Prison Hospital.—(Allopathic.)

Whole number of patients received.....1,562
 Per centage of deaths, 14 7-10.

It is but simple justice that I should state that the treatment of the patients at the Mound City General Hospital was not and could not have been, for obvious reasons, entirely homœopathic. Had the authority been delegated me to employ homœopathic physicians rather than mould to my practice those of allopathic proclivities, whose contracts were made with the medical directors of the district, I have not the slightest doubt but that the ratio of mortality would have fallen below 6 per cent. I assert this with a clear and full understanding of the premises, and from a large experience in the treatment of patients in military hospitals.

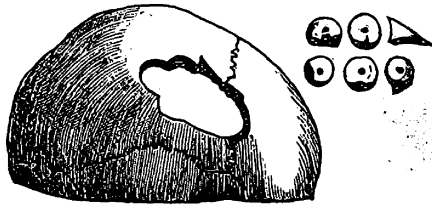
*Gunshot wounds of the head.**—This important class of injuries embraces not only fractures and injuries of the cranium, but also contusions and flesh-wounds of the scalp. In the surgical history of the late rebellion, 1,104 cases are recorded of gunshot fractures and injuries of the cranium, and violent contusions resulting in lesions of the encephalon. Of 604 cases of which the results have been ascertained, 405 died and 199 recovered. In 107 of these terminated cases, in which the operation of trephining was performed, 60 died and 47 recovered. In 114 cases, fragments of bone or of foreign substances were removed by the elevator or forceps, without the use of the trephine, and of these 61 died and 53 recovered. When operative procedures were instituted, the recoveries were 45.3 per cent. In the 483 cases treated on the expectant plan, the ratio of recovery was only 20.5 per cent. This latter group includes nearly all of the penetrating and perforating

* Compiled from "Circular No. 6" of the Surgeon-General's Department, with many new and interesting cases from my private museum.

fractures; hence the comparative success following these two procedures can only be approximated. The gunshot contusions and wounds of the scalp were 3,942, of which 103 terminated fatally—probably owing to some undiscovered injury done to the cranium or its contents, or consecutive lesions of the encephalon. Fatal results in many cases depended upon concussion or compression of the brain, or upon the formation of abscesses in the liver or lungs, in consequence of inflammation in the veins of the diploe. Compression was the result either of extravasation of blood, inflammation of the brain or its membranes, or from suppuration. The following is an example of a scalp-wound followed by inflammation of the bone and meningitis:

“A private received a gunshot wound of the scalp, with no subsequent cerebral symptoms, and it was thought the pericranium had escaped being injured. He was up and about the hospital for more than a month, when of a sudden he was seized with convulsions, which were followed by coma. The trephine was applied, and the bone found to be diseased, with pus beneath and oozing from the diploe. Five perforations were made by the trephine, both to remove the diseased bone and give free exit to matter. The coma continued, and the patient died in twelve hours after the operation.” See Fig. 187.

Fig. 187.



Section of a cranium, exhibiting five trephine perforations for the evacuation of pus, the result of a gunshot contusion of the right parietal.

The fallacy of Potts' views, to trephine for pus under the calvaria, is illustrated in this case; and yet, standard modern authorities advise this operation as affording the only chance of recovery. Records preserved during the late rebellion corroborate the observations of Mr. Hewett, that “the successful issue of a case of trephining for matter between the bone and the dura mater, is almost unknown to surgeons of our time.”

Eight cases are recorded of that rare and interesting variety of gunshot fracture of the cranium, in which the external table is unbroken, while the internal is fissured and sometimes depressed. The following cases, illustrative of this injury, in which a fragment of the vitreous plate of the frontal bone was found to be completely detached and depressed upon the dura mater, is subjoined:

“Private ——— was wounded by a conoidal ball, admitted into hospital six days after injury, in a comatose condition, and died twelve days after admission. An autopsy showed fracture of the inner table of the frontal bone, near the coronal suture, to the left of the median line. The outer table presented no solution of continuity, but was somewhat softened where the pericranium was destroyed by the ball. The detached fragment measured one and a half inches in length by one-half inch in breadth.” (Figs. 188 and 189.)

Fig. 188.



Exterior view of the fore-going specimen.

Fig. 189.



Fracture of the vitreous table of the frontal bone, without fracture of the external table.

This accident is believed to result in most instances from a small projectile striking the cranium very obliquely, or, possibly, in some cases, from a comparatively slight blow from a body with a large plane surface.

An injury closely allied to this, in which a ball produces linear fissure of the external table, with displacement of the inner table, is among the specimens in my private museum.

Case 84.—C. M., seaman on gunboat *Pittsburg*, was struck by a piece of shell on the frontal bone, one and a half inches above the right eyebrow. The surgeon, supposing it to be a mere flesh-wound, dressed it. A few days after this case was sent, with others, to the Mound City Hospital, the patient walking from the boat to the building, and would not occupy the bed allotted to him save at night. He continued walking about the hospital grounds, and assisted in taking care of his wounded comrades. On the tenth day after receiving the injury, at two o'clock P. M., he complained of nausea and vomiting, at five was delirious, with stertorous breathing, etc., and died at six P. M., one hour afterward. Post-mortem examination developed extensive fracture, with depression of the internal table, and clot between the calvaria and dura mater. The outer table was fissured to the extent of two inches, the pericranium being unbroken and entire.

Several cases of undepressed fracture are reported in which a ball gouged out a small portion of the external table. A number of instances are recorded in which considerable portions of the calvaria have been removed by explosions of shell, without depression. A musket-ball is said to have produced the same effect. These injuries are not necessarily fatal, but require prompt surgical interference in relieving all spiculæ of bone and foreign matters;

otherwise the case is to be treated as already pointed out. The necessary operative procedures in all cases of fracture, with depression of both tables of the skull, are the same, from whatever instrument the injury may be inflicted. These will receive minute and careful consideration in the volume on Operative Surgery, as well as the subsequent treatment to be adopted, both general and local.

Instances were not uncommon of the splitting of round musket-balls in striking the skull at an acute angle. The conoidal balls, it was observed, were even less liable to split; yet such cases were occasionally witnessed.

The depressed fractures produced by cannon-balls, or by the explosion of large shells, were commonly attended by frightful comminution and disjunction of the sutures, and were almost immediately fatal, and hence had little surgical interest.

A few extraordinary and exceptional recoveries after penetrating and perforating fractures of the cranium have been reported, and in rare instances the fatal termination has been long delayed.

According to Mr. Teevan's experimental inquiries,* the aperture of exit in gunshot perforations of the cranium is always larger than the aperture of entrance, for the reason that, besides the ball, the fragments of bone from the proximal table and diploe are driven out.

While the number of fatal results after trephining are very great, still the successes are quite numerous. It is difficult to avoid the impression, says the "circular," that a larger measure of success has attended this operation in the late war than the previous experience of military surgeons would have led us to anticipate. Surgeon Bliss, U. S. Vols., reported eleven successes after the use of the elevator or trephine.

In eleven cases of trephining which I performed at Mound City and other hospitals, *ten* recoveries took place, and one death only occurred. The records of a number of these are preserved in my private museum for future reference.

As a type of the operations of this class, the following cases are given:

Case 4. — J. R. K., sergeant, Co. G, 22d Illinois Infantry, wounded at the battle of Belmont by a rifle-ball, which entered the

* British and Foreign Medico-Chirurgical Review, vol. xxxix, p. 205.

Fig. 190.



posterior portion (Fig. 190) of the occipital bone, producing a fracture and depression of both tables. A spicula of the inner layer was driven into the substance of the brain, causing compression. By the aid of the trephine and elevator, the depressed bone was removed, the roughened edges made smooth, the lips of the wound brought together by two silver sutures, and *calendula* lotion freely applied to the seat of injury. Result, a complete recovery, and the patient was discharged from hospital, cured, January 22d, 1862. (See Case 5, Collection B.)

Case 8.—W. C., private, Co. H, 14th Illinois Infantry, received wound of scalp and fracture of left parietal bone, by a musket-ball, which was accompanied with paralysis of right arm. Upon entrance into hospital, constipation was present, with

Fig. 191.



pains in the lower extremities. In trephining the skull, I removed a small piece of bullet impacted in the internal table, a portion protruding into the substance of the brain. The edges of the wound were freshened and coaptated by strips of adhesive plaster, and a few hairs taken from either side of the wound, twisted in the shape of a small cord, and tied so as closely to adapt the cut surfaces. The subsequent treatment consisted in *calendula* lotions to the scalp, stimulating liniments to the extremities, and frequent doses of *aconite*, *hepar*, and *nux*. In seven weeks the external wound had entirely healed, but the right arm remained partially paralyzed. He was removed to one of the hospitals at Keokuk subsequently, since which time I have heard nothing of the case; Fig. 191. (See Case 8, Collection B.)

Even in those almost hopeless cases in which compression of the brain follows a gunshot injury of the skull at a late date, instances of recovery are reported.

The occurrence of hernia, or fungus cerebri, is mentioned in connection with eighteen cases of gunshot fracture of the skull, complicated by lacerations of the dura mater and brain. In four of these, recovery took place without operative interference with the protruding fungous mass, which in three instances gradually contracted, became covered by granulations, and finally cicatrized. In those cases in which bandaging and compression of the fungus was resorted to, cerebral irritation was soon developed, followed by stupor and coma. In those in which the protruding brain was sliced off, as usually recommended, at the proper level of the brain, reproduction of the tumor speedily ensued, and finally death from irritation was the result. In the *after-treatment* of gunshot injuries of the head, two general facts are presented: 1st, that a large number of surgeons do not consider spare diet, perfect rest, and anti-phlogistic measures as of essential importance; and 2d, in the treatment of cranial fractures, the general tendency of practice was to adopt the principle advocated by Guthrie in regard to operative procedures, rather than the more expectant plan insisted upon by the majority of modern European writers on military surgery.

Gunshot wounds of the face.—Of 4,167 gunshot wounds of the face reported during the war, there were 1,579 fractures of the facial bones, and 2,588 flesh-wounds. Of the former, 891 recovered, 107 died, and in 581 cases the terminations are still to be ascertained.

Secondary hemorrhage has been the principal source of fatality in these injuries. It is a frequent complication in gunshot fractures of the facial bones; and the difficulties in securing bleeding vessels in this region are very great. In a number of cases recourse was had to ligatures of the carotid, with the result of postponing for a time the fatal event.

In *eight* resections of the lower jaw which I performed at various times during the war, involving from one-fourth to one-half of its whole continuity, I only knew of a single death; at least, none others were reported during my term of service. In Fig. 192, half of the lower jaw was removed.

Case 21.—D. R., private, 18th Ill. Vols., wounded at Fort Donelson by a Minie ball entering at the symphysis of the lower jaw, producing compound fracture of that bone, and, passing onward, caused a fracture of its ramus about one-half inch above the angle

of the jaw, at the aperture of exit as represented in Fig. 192. The entire base of the bone was badly shattered, the alveolar processes

Fig. 192.

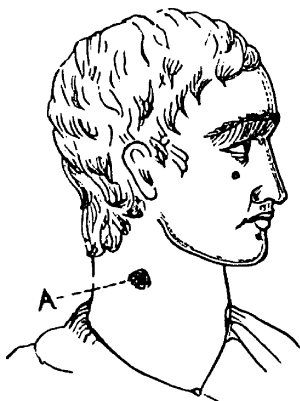


entirely separated from the body. I resected the entire half of the bone, from the symphysis to the condyle, inclusive. The ramus of the jaw above the angle was taken out by slitting up the periosteum, and detaching it from the bone by the handle of a strong scalpel, and dividing its attachments whenever required. All spiculæ and other portions of the body were removed, and the edges of the wound brought together by the interrupted suture. *Calendula* lotions were applied locally, and *ac.*, *calend.* and *hepar* administered internally. The wound healed

rapidly without any unpleasant symptom, and the patient left hospital, entirely well, April 28, 1862.

Case 24.—J. S., 8th Regt. Ark. Vols., wounded by a musket-ball at battle of Fort Donelson, the bullet entering the face about one-half inch below the right eye, splintering and fracturing the upper jaw, and splitting in two; one half penetrated the antrum

Fig. 193.



A—Exit of ball.

and remained, while the other half deflected and passed outward, where it lay beneath the integument at a point corresponding with the letter A in the cut, Fig. 193. I then examined the parts for the remaining half of the ball, and found it imbedded within the antrum. The superior maxillary was quite extensively shattered and broken, and fearing the supervention of constitutional trouble by necrosis, suppuration, etc., I proceeded to resect the upper jaw, leaving the palatine process unharmed. The lips of the

wound were coaptated and retained by three interrupted sutures and strips of adhesive plaster, and *calendula* used externally and internally, and *ac.*, *sil.*, *ac. phos.*, *hepar*, and *calc.*, were given

internally, according to indications. Patient left hospital March 6, entirely cured.

In *seven* partial resections of the upper jaw, three of which I performed at Mound City, and the others in field hospitals, two died from secondary hemorrhage. Plastic operations were made in three cases, with complete success. Fig. 193 represents the appearance of wound before operation.

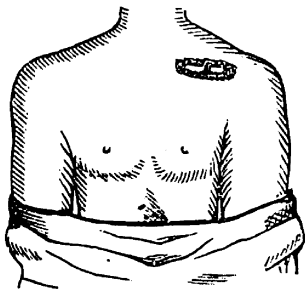
Owing to the great vascularity and vitality of the tissues in this region, gunshot wounds of the face have commonly healed rapidly, and many creditable plastic operations for the relief of deformities have been successfully performed.

Gunshot wounds of the neck.—Of the 1,329 cases of wounds in this region entered upon the records, the ultimate results have been ascertained in 546 cases only, and, so far as the histories of this number of wounds could be traced, the mortality is 14 per cent.

Several instances are recorded in which large grape-shot, on striking the hyoid bone, were deflected, and buried themselves in the supra-spinous fossa of the scapula, or among the muscles of the back. These patients died from laryngitis or oedema of the glottis, and might have been saved, perhaps, by tracheotomy; but they died suddenly, when surgical assistance could not be immediately procured.

In *two* cases of resection of the clavicle from gunshot wound (Minie ball), occurring in my practice, the first involving one-third, the other two-thirds of its whole extent, one recovered and the other terminated fatally, death having been produced by hospital erysipelas. *Vide* report of case in North American Journal of Homœopathy, vol. xi., p. 266. (Fig. 194.)

Fig. 194.



Gunshot wounds of the back and spine.—In this class are included the fractures of the vertebral column which were not complicated by penetrating-wounds of the chest or abdominal cavity, and flesh-wounds of the region covered by the trapezius, latissimus dorsi, and gluteal muscles. Of 187 recorded cases of gunshot fracture of the vertebræ, all but 7 proved fatal. Six of these were

fractures of the transverse or spinous apophyses. In the seventh case, the spinous process of the fourth lumbar vertebræ was fractured, the ball penetrating to the vertebral canal. The ball and fragments of bone were extracted, and at last reports his recovery was almost certain.

Dr. T. S. Verdi reports a case of gunshot wound of the spine, involving the last dorsal vertebræ, the ball having been impacted in the body of the vertebræ, producing great pain and semi-paralysis. Dr. V. removed the ball, which was divided in four pieces, and the patient recovered.

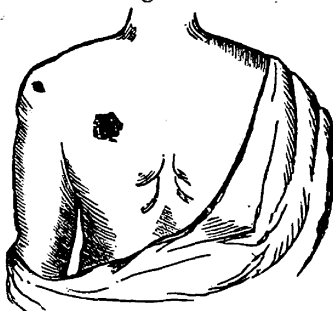
Gunshot wounds of the chest.—Of 7,062 gunshot wounds of the chest, there were 2,303 that either penetrated the thoracic cavity, or were accompanied by lesions of the thoracic viscera. The results were ascertained in 1,273 of these, and were fatal in 930, or 73 per cent. The balance, 4,757, were flesh-wounds, and gave a very small ratio of mortality. These wounds, in consequence, no doubt, of the mobility of the thoracic parietes, were long in healing. The cases of wounds of the lung by the sharp edges of the fractured ribs, or of contusion of the lung by non-penetrating gunshot injuries, are classed with the penetrating-wounds.

In the treatment of penetrating-wounds of the chest, bleeding was entirely abandoned. Hemorrhage was treated by the application of cold, perfect rest, and the administration of opium. In no instance was the operation of paracentesis performed, or of the enlargement of wounds for the evacuation of effused blood. Hemorrhage from the vessels of the costal parietes was exceedingly rare, and, in the few instances recorded, was a secondary accident. It was the common practice to remove splintered portions of fractured ribs and to round off sharp edges that were likely to wound the pleura or lung. After this, with the exception of extracting foreign bodies whenever practicable, and performing paracentesis for *empyema*, the treatment adopted was the *expectant*, or abandoning these cases to the natural process of cure.

In *three* partial resections of the scapula, involving portions of the superior and inferior borders, which I performed during my army service, all recovered, with little or no loss of motion. In one case only was the patient unable to elevate the arm above the head, but in all other directions motion was as perfect as before

injury. Figure 195 is illustrative of resection of a large portion of the scapula, as taken from the hospital records of Mound City.

Fig. 195.



Case 43.—S. R., 7th regiment Iowa volunteers, wounded at the battle of Belmont by a Minie ball entering about the center of the coracoid process of the scapula, splintering it and passing under the supraspinatus, denuding the bone of periosteum throughout its whole track, comminuting extensively the body and spine. The ball passed out near the lower margin of the scapula, leaving a rugged and uneven opening. Extensive inflammation followed the injury, with œdema of the surrounding tissues, accompanied with profuse suppuration. Attempts were made to save the body of the scapula by local and constitutional means, such as washes of *arnica*, *calendula*, and evaporating lotions, stimulating injections, and removal of all spiculæ of bone as fast as they were detached; but the patient gradually wasted away in spite of our efforts. At this juncture I determined to resect the spine and body of the bone beyond the neck, which was effected with slight loss of blood. The same local measures were now employed that were used in the first instance, and *hepar* and *silicea* given internally. The patient gradually recovered, and left the hospital seventy days from entrance, with tolerably good motion of the arm.

The records of the results of the so-called method of "hermetically sealing" gunshot penetrating-wounds of the chest are sufficiently ample to warrant an unqualified condemnation of the practice. The histories of the cases thus treated have been traced, in most instances, to their rapidly-fatal conclusion. Only one of the many cases treated according to this method is reported as having been cured.

In those cases where the track of the ball passed near the root of the lung, few instances of recovery are recorded. The cases in which there was a fracture of the rib at the wound of entrance were the most dangerous. The established opinion that penetrating-wounds, with lodgment of the ball, were more fatal than perfo-

rating-wounds, was fully corroborated—a very few instances having been recorded of recovery where the ball lodged in the lung.

Wounds of the chest, after the battle of Wilson's Creek, August, 1861, so far as my own observation goes, were generally unproductive of much promise, owing to the want of proper homœopathic remedies; although two or three severe lesions of the lungs from musket-balls, treated in private residences, where more care and attention could be given them than in the crowded hospitals, rallied and finally recovered. Of *seven* cases admitted into Mound City Hospital and treated under my own immediate supervision, and where better facilities were afforded for proper treatment, there were *four* recoveries and *three* deaths. In three cases where the ribs were splintered, the fragments of bone were removed and the roughened surfaces made round and smooth.

Only four cases are recorded of gunshot wounds of the heart during the war. The patient that lived the longest after a gunshot wound of the heart survived twelve hours, in a case where a small pistol-bullet entered the left ventricle and passed out through the right auricle.

Gunshot wounds of the abdomen.—Of 2,707 gunshot wounds of the abdomen, 2,164 were flesh-wounds merely, and 543 cases in which the peritoneal cavity was penetrated or the abdominal viscera injured. Among the flesh-wounds recorded, there were 114 cases which terminated fatally, in consequence of sloughing from injuries of the abdominal parietes by shells. Of the 543 penetrating-wounds, the results have been ascertained in 414, of which 308 were fatal, or 74 per cent. In many instances fæcal fistulæ were produced, which commonly closed after a period, without operative interference, and reopening at intervals, and then healing permanently. Recoveries after wounds of the large intestines were much more numerous than after wounds of the ilium or jejunum. In no case was it thought expedient to apply a suture to the intestines after gunshot wounds.

Gunshot wounds of the liver were usually followed by extravasation into the abdominal cavity, followed by rapidly-fatal peritonitis. Of 32 cases of this character, all but four terminated fatally.

All the cases of gunshot wounds of the spleen reported proved fatal. A case is mentioned of a lacerated wound of the abdominal walls, with lesion and protrusion of the pancreas, a portion of

which is said to have been excised; but it is believed that the portion referred to was *omentum* rather than the pancreas.

Gunshot wounds of the bladder, when the projectile entered above the pubes, or through the pelvic bones, have uniformly proved fatal, as far as the record has been examined. Those parts of the bladder uncovered by peritoneum, in which injury has been sustained, present many examples of recovery.

Several examples of recovery after protrusions of the abdominal viscera through gunshot wounds have been reported. In two cases, in which loops of small intestine issued, they were immediately returned and retained by means of adhesive strips and bandages, and the patients recovered with ventral hernia. The escape of omentum through wounds does not appear to be a very serious complication; for in many cases portions of protruding omentum have been excised, and the patients have recovered promptly.

Of gunshot wounds of the abdomen, there were only *seven* cases that came under my care during the war; three of these were wounded at the battle of Wilson's Creek, 1861, by a musket-ball passing through the abdomen from before backward, rupturing the colon and forming an artificial anus both in front and rear; of these, two recovered entirely; the third died on the ninth day, of inflammation and mortification of the intestine. One of the survivors, from the city of Dubuque, Iowa, continued in the army up to the siege of Vicksburg, 1863, at which time I met him performing the ordinary duties of an officer. The *four* remaining cases were inmates of the Mound City Hospital, and the results of treatment have escaped my memory. In neither case was any operative procedure had, all being treated on the "expectant plan."

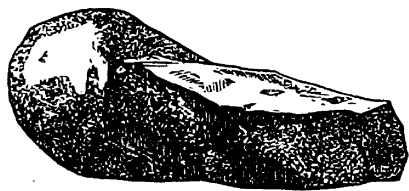
Penetrating-wounds of the abdomen, complicated with fractures of the vertebræ, uniformly prove fatal.

Gunshot fractures of the pelvis.—Of 359 cases in which the abdominal cavity was not penetrated, recovery took place in 97, and the result in 185 is still unknown. In 256 cases, the ilium alone was injured; the ischium alone in 19; the pubes in 12; the sacrum in 32, and in 40 the lesions extended to two or more portions of the innominate. The gravity of the cases depended upon the location and extent of the fracture. The majority of recoveries were from fracture of the ilium by musket-balls, in which the crest

was grooved or comparatively slight injury was inflicted. Yet there were many examples of perforation of the body of the ilium, with ultimate recovery. In most cases of injury of the pelvic bones, very tedious suppuration ensued, and surgery could effect but little else than to facilitate the escape of pus and to remove dead bone as it became detached. The observation of Straymeyer, that there is a great liability to pyemia in gunshot fractures of the pelvis, is fully corroborated in the records.

Gunshot wounds of the genito-urinary organs.—In this category are included gunshot wounds of the genitals or urinary organs, uncomplicated with fractures of the pelvis or with penetration of the abdominal cavity. The records furnish, of such wounds, 457 cases, of which 37 terminated fatally. Surgeon Gross, U. S. V., reports a very interesting case of a soldier struck on the right side of the penis by a conoidal musket-ball, which buried itself in the corpus cavernosum, and became encysted. It caused so little pain that the patient refused to have it extracted. Another exceedingly-interesting case is reported by Surgeon Randolph, U. S. A., of a gunshot wound of the bladder. The patient was wounded during the siege of Vicksburg, June 23, 1863, by a fragment of a hand-grenade, which entered the right nates two inches outside the extremity of the coccyx, and perforated the bladder, where it lodged. Urine was voided by the wound immediately after the injury, and continued so to pass away, largely mixed with pus and blood. His general condition was improved by the use of stimulants, diuretics, fomentations, and nutritious diet. In nine months after the injury

Fig. 196.



was so far closed as to admit only a large-sized probe. Attempts to pass a catheter or probe caused chills and febrile irritation. On April 2d following, the lateral operation of lithotomy was performed, and a rectangular fragment of shell, largely incrustated with earthy phosphates, was extracted, measuring 2 inches in length, $\frac{7}{8}$ of an inch in width, and $\frac{3}{8}$ of an inch in thickness. On April 27th the urine passed by the natural channel. The specimen weighed 898 grains: Fig. 196.

(March 19, 1864), the wound

Gunshot wounds of the upper extremities.—Gunshot wounds of these extremities, unaccompanied by lesions of the vessels and nerves, are not injuries of a very serious nature. After extracting all foreign bodies, and under the use of the local measures already alluded to, they heal kindly and in a short space of time. The wounds involving fractures of the upper extremity are divided into four classes: *First*, those of the scapula and clavicle, in which the ball has not entered the cavity of the chest; *second*, those of the shaft of the humerus and either of its articulating extremities. *third*, those of the radius and ulna; and *fourth*, those involving the bones of the carpus and metacarpus. The entire records of the *first*, *third*, and *fourth* classes have not been completed. Of the *second* class, 2,408 cases are reported, involving fractures of the humerus. Recovery followed in 1,253 cases, death in 436, and in 719 the result is yet unpublished. In the 1,689 completed cases, amputation or excision were practiced in 996, and conservative treatment was adopted in 693, with a ratio of mortality of 21 per cent. in the former and 30 per cent. in the latter.

In some cases of gunshot wounds involving the shoulder and elbow-joints, removal of splinters and excision of the injured portions of bone has been substituted for amputation with the most successful results, the injury done to the soft parts being treated on the principles already recommended. The value of excision of these joints following gunshot injuries has been abundantly established, not only by the observations of European surgeons, but by the extensive experience of American surgeons in the late war. M. Baudens relates that he saved thirteen out of fourteen cases of excision of the shoulder. Mr. Thornton, of the British army in the Crimea, reports twelve excisions of the shoulder, with two deaths, and seventeen cases of the elbow, of which two were fatal, and five *partial* resections of the elbow, all of which were successful. In comparing the results of *excision* of these joints with *amputation* of the same portions, it will be seen that the former operation is the most successful. Of sixty-six disarticulations at the shoulder, nineteen were fatal; and of one hundred and fifty-three amputations, death occurred in twenty-nine. Excisions of the lower extremities following gunshot injuries did not, however, produce results so favorable; for in six cases in which the head of the femur was excised, only one case recovered, and in two cases in

which portions of the femur were removed, and in one in which the knee-joint was excised, death ensued.

In the Russian army, conservative surgery was likewise practiced with corresponding good results, for of 20 cases of excision of the elbow, 15 recovered. It is worthy of notice, in this connection, that excisions in the lower extremities following gunshot wounds are not so successful as the same operations following disease.

Amputations at the shoulder-joint.—The reported cases of *amputation* at this joint number 458, while *excisions* of the head of the humerus were 575. Of the 237 terminated cases of *amputation*, 93 died, or a ratio of mortality of 39.2. The per centage of mortality in *resections* is, in primary cases, 23.3, and in secondary cases, 38.59, or a mean ratio of 32.48, showing a per centage of 6.76 in favor of excision.

In *three* cases of amputation at the shoulder-joint, two of which were performed at Mound City and one during the siege of Vicksburg, all made good recoveries. The result of these three additional cases must therefore, to a certain extent, influence the ratio of mortality above cited.

Excision of the shoulder-joint.—Of thirty-six cases of gunshot fracture of the head of the humerus, selected as favorable cases for the expectant plan, and treated without excision or amputation, sixteen died, or 44.4 per cent., a ratio in favor of excision of 11.96 per cent.

Esmarch* makes the curious observation that resection of the left shoulder gives less favorable results than the operation on the other side. This statement, it will be observed, is not confirmed by statistics; for of 442 terminated cases, the right shoulder was involved in 200 and the left in 242, and the operation resulted fatally in 72 of the former, or 36 per cent., and in 71 of the latter, or 29.3 per cent. The greater frequency of this injury on the left side is undoubtedly due to the exposed position of the left shoulder in firing. Excision was performed generally in those cases in which the head of the bone was alone implicated, and consisted simply in a decapitation of the humerus. Partial excisions were seldom practiced. The method commonly preferred was that by a single vertical incision, though some surgeons preferred a V-shaped flap,

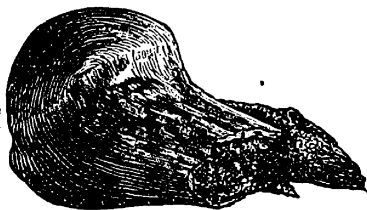
*Slatham's edition of Esmarch, American edition, 1862, p. 57.

but all endeavored to include the wound made by the ball in the incisions. Frequent mention is made of preserving the long head of the biceps. In 29 cases, portions of the clavicle or of the coracoid and acromion processes and neck of the scapula were excised, as well as the head of the humerus. Of these cases, 4 only terminated fatally, giving an average result as satisfactory as in decapitation of the humerus alone.

In *eleven* resections of the shoulder-joint made by me during the war, most of which were primary operations, there were nine recoveries and two deaths; and I attribute the death of one of these cases to subsequent disease incurred while being transported from the front to the more remote hospitals of the North. In one case I removed over five inches of the humerus, including the head, and the patient made a good recovery. The vertical incision was the method commonly preferred, and, in cases of excision following gunshot, I prefer it to any other.

Where the shaft of the humerus has been extensively shattered, the head, with five or six inches of the diaphysis, has been frequently removed with success, in disregard of the prohibition of Guthrie, as is shown in Fig. 197.* Stromeyer has very truly observed that, in gunshot fractures of the surgical neck of the humerus, with extensive longitudinal splitting, the fissures rarely implicated the epiphysis; yet the head of the bone in these cases seems to have been

Fig. 197.



Head of humerus removed at siege of Vicksburg.

pretty generally removed with the most excellent results. The limbs preserved by this operation have enjoyed a very satisfactory degree of motion at the shoulder-joint, and possess in a limited degree the power of abducting the arm. The control over the movements of the arm is much augmented by a contrivance furnished by the makers of surgical apparatus, in which elastic bands

* From a specimen in my private museum. The patient was wounded at siege of Vicksburg. Was operated upon during anæsthesia from shock. The single incision was used. Recovery was most rapid and complete, hardly a tablespoonful of pus escaping during the after-treatment.

Fig. 198.



Appearance of patient after wound healed.
(After Circular No. 6.)

supply the diminished power of the deltoid and biceps. Fig. 198 represents the appearance of patient after the operation, so far as concerns motion of the arm.

Amputations of the arm.

—Of 2,774 cases of amputation of the arm recorded, the results have been ascertained in 1,949 cases, of which 1,535 recovered. The operations were performed generally in the middle and lower thirds, and of this number 1,064 have been furnished with artificial arms. The double flap method has been generally preferred.

In *eleven* cases of immediate amputation of the arm, which I performed during the siege of Vicksburg, from December 27, 1862, to May 20, 1863, only one died up to the time of my leaving the service. My experience in regard to primary amputations in the upper extremities is that they are more successful than resections in the continuity of the bone. The double flap for the arm and the circular incision for the forearm was my almost uniform practice.

Excision in continuity of humerus.—The great surgeons who have done most toward substituting excision for amputation in gunshot injuries of joints, have almost uniformly condemned excisions of the continuity of the long bones in the treatment of gunshot fractures. The surgical history of the Crimean war, of the Schleswig-Holstein campaigns, and of the Indian revolt, give few successes in resections of the shafts of the humerus, tibia, and the bones of the forearm; and, until the great American war, this class of operations held a questionable position among the established and approved procedures of surgery. The late war for the Union, however, has furnished ample materials for arriving at correct conclusions on this subject, and for determining how far these measures enter into that true conservatism which has for its *first* object the

saving of life, and refuses to jeopardize lives in order to save limbs. So far as these operations have been analyzed, the evidence presented is antagonistic to excisions in the continuity of long bones.

The following table shows the number of cases of excision in the continuity of long bones during the American war, and the results :

CHARACTER OF EXCISION.	Died	Recovered	Amputation ultimately required	Result not yet determined	Total	Per cent. of mortality
Excisions in continuity of the humerus.....	42	133	7	79	261	24.00
“ “ “ radius.....	11	93	3	67	174	10.57
“ “ “ ulna.....	16	100	3	61	170	13.79
“ “ “ radius and ulna	5	24	1	10	40	17.24
“ “ “ metacarpal bones	2	30	...	18	50	6.25
“ “ “ femur.....	32	6	5	24	62	84.21
“ “ “ tibia	11	48	3	20	84	18.64
“ “ “ fibula	15	60	1	15	93	20.00
“ “ “ tibia and fibula	1	4	...	2	8	25.00
“ “ “ metatarsal bones	5	26	...	2	33	19.23
Total.....	140	524	23	288	975	26.71

After excisions of portions of the continuity of the humerus for gunshot fractures, a number of patients have obtained tolerably useful limbs. But the mortality of the operation is three per cent. greater than after amputation of the arm. Excision in the continuity of both bones of the forearm gives a larger rate of mortality than amputation of the forearm.

Amputation at the elbow.—The returns corroborate the conclusions of Dupuytren, Malgaigne, and Legouest, who combat the disfavor into which this operation has fallen. Only nineteen cases were reported during the war. The success of Salleron and other French surgeons with this operation in the Crimea is well known. Whenever, then, it is impracticable to amputate the forearm, disarticulation at the elbow-joint should be preferred to amputation, and the oval method is the one that promises the best results.

Excisions of the elbow.—Of 315 cases of excision of the elbow following gunshot fractures, in 286 cases the results are ascertained. In 16 of the cases, amputation of the arm became necessary, and 62 had a fatal termination, or 21.67 per cent., which gives a mortality a fraction greater than that resulting from amputations of the arm. *Two* cases of excision of the elbow done by myself,

and one by G. S. Walker, of St. Louis, Surgeon of 6th Reg't Missouri Volunteers, terminated favorably, which decreases the mortality above given to a certain extent, as these cases were not reported to the Surgeon-General's Department at Washington. These figures will be somewhat changed by the three cases alluded to above. This result varies considerably from the experience in the Crimean and Schleswig-Holstein wars, but will doubtless be considerably modified when the statistics are completed. The brilliant results of this operation are so well appreciated by the profession, that it already occupies an exalted position in the annals of conservative surgery.

Amputations of the forearm.—This operation has generally been performed *secondarily*, except in those cases in which the wrist or lower extremity of the radius have been shattered by large projectiles. Of the terminated cases, 99 died and 500 recovered. In the forearm, the amputation by the double flap method has been generally preferred.

Excisions in continuity of forearm.—By reference to the statistical table, it will be seen that excisions in the continuity of both bones of the forearm has a larger mortality ratio than amputation of the forearm. Those cases in which small portions of the radius were removed did better, according to the author's experience, than the same operation done in the continuity of the ulna; in fact, in regard to excision in the continuity of these bones, he has not been impressed with hopefulness of result.

Amputations at the wrist.—The disarticulation at the wrist has been performed in preference to amputation of the forearm, when the hand was totally disorganized. The circular method is recommended as the best procedure, and the results show it to be a good operation. The mortality in the cases recorded are satisfactory to the department, being 10 per cent. less than in amputation of the forearm.

Excisions of the wrist.—In the 35 cases included in this category, all were examples of *partial* excision. In 27, the ends of the radius or ulna, or of both, were removed, and in some instances, shattered fragments of the upper row of carpal bones. In 8, the greater part of the carpus was removed. Death took place once from pyemia, and twice from exhaustion following protracted supuration and irritative fever. The recoveries are 26. In 2 cases, amputation of the forearm became necessary. In regard to the

amount of mobility and usefulness in the member preserved, the accounts are entirely unsatisfactory. Professor Joseph Leister's recent paper,* in which such brilliant successes are said to follow his method of excising the entire wrist-joint for caries, stimulates the hope that hereafter this operation may be successfully adopted in cases of gunshot wounds of the wrist.†

Amputations of fingers and portions of the hand.—The unimportance of these operations and their results, in comparison with the preceding, has not only led to its too frequent performance, but in a large majority of cases no official reports have been made to the Department at Washington; consequently, of the great number of these operations performed, only the records of 1,807 cases have been completed, and the mortality from these reach 1.64 per cent. Of these cases, 29 terminated fatally, and from the following causes: erysipelas, 4; gangrene, 2; tetanus, 1; and in 18 different intercurrent diseases, such as typhoid and malarial fevers, fever, pleurisy, etc.

Amputation at the hip-joint.—The uniform fatality that followed this amputation in the Crimean war was so firmly impressed upon the minds of American surgeons, that at the commencement of the great rebellion the operation was altogether discarded. Notwithstanding this, it has been occasionally performed, and the saving of life in three recorded cases has been the result. Of all amputations at the hip-joint for gunshot injury, 9 were primary and 12 were secondary operations. Of these 21 cases, there were 3 recoveries, 2 of whom were operated upon primarily, and the other 1 secondarily. The successful surgeons were Surgeons E. S. Fenner, Edward Shippen, and Acting Assistant-Surgeon I. H. Packard, U. S. Volunteers.

Three conditions only are recommended under which early amputation at the hip-joint is admissible in military surgery, viz: *First*, when nearly the entire thigh is carried away by a large projectile; *second*, when the totality of the femur is destroyed by osteomyelitis; and *third*, when, with comminution of the upper extremity of the femur, the femoral vessels are wounded.

The experience of M. Jules Roux, in the Italian war, seems to

* Lancet, American edition, July, 1865, p. 306.

† This operation will be fully described in Operative Surgery.

prove conclusively that secondary amputations at the hip-joint are less dangerous than primary ones, for in 6 cases (all secondary) amputated at Toulon, 4 recoveries and 2 deaths were the gratifying results of this operation.

As to the method of operating, the anterior single-flap procedure has most generally been preferred.

Excisions of the head of the femur.—Previous to the American war, there were on record twelve cases of this operation, with one successful result. This case was reported by Surgeon O'Leary,* of the 68th British Infantry, who excised the head and several inches of the shaft of the femur in one private Thomas Mackenna, the great trochanter being shattered by a fragment of shell.

Experience having proven the uniform fatality of gunshot fractures of the head or neck of the femur when left to the resources of nature, and the excessive mortality that followed amputation at the hip-joint, the highest authorities in military surgery were then unanimous in advising, under suitable conditions, excision of the head of the femur, until, as Baron Larrey remarked, the experiments of the future proved more discouraging than the experience of the past. During the late American war there were 32 cases of excision of the head of the femur, with four successful results; thus showing a decrease of mortality from this operation as compared with statistics previous to that time. The names of the successful operators were David P. Smith, U. S. Vols.; George A. Mursick, Assistant-Surgeon U. S. Vols.; J. B. Reed, Surgeon C. S. A., and another surgeon in the Confederate service, whose name is yet unknown. The preserved extremity in three cases mentioned was of considerable use to the patient; the limb was movable in one case in every direction, and perfectly under the control of the muscles, and the leg can be made useful to the patient when strengthened by artificial appliances.

Amputation of the thigh.—In 1,597 terminated cases, 568 recovered and 1,029 died, giving a mortality of 64.43 per cent., which is within a fraction of the mortality following the same operations in the English army in the Crimea during the latter part of the campaign. In the French army in the Crimea, the whole number

* Medical and Surgical History of the British Army in the Crimea, vol. ii, p. 378.

of amputations of the thigh for gunshot injuries was 1,666, of which 1,531 terminated fatally, or 91.89 per cent. Of the 1,597 amputations during the American war, 423 were *primary* and 638 were intermediate or *secondary*. In the former the ratio of mortality was 54.13, and in the latter 74.76. Reports are on file embracing 439 other cases of recovery after this operation, in which artificial limbs have been provided. These cases are excluded from the registers on account of the absence of deaths for the corresponding periods, not being completed.

In *thirteen* cases of *primary* amputation of the thigh and leg performed by myself during the siege of Vicksburg, and following the battles of Chickasaw Bayou, Champion Hills, and Black River Bridge, there were *four* deaths. The method of operating preferred was the double flap for the thigh and the circular for the leg. In thirty-nine cases of *secondary* amputation, mostly upon the lower extremities, the mortality, as far as I have been able to collect the statistics, was over *forty* per cent. In General Hospital, Springfield, Mo., the number of amputations of the thigh and leg was large, and all *secondary*; the mortality was in excess of that at Mound City. This was, in a great degree, owing to the depressing moral and physical causes operating upon the patients at the time.*

Excisions in the continuity of the femur.—The specimens in the museum and the records afford emphatic arguments against formal excisions of the shaft of the femur. With one exception, the few cases that recovered were those in which, after the removal of detached fragments, the least amount of operative interference had been practiced. The remark previously made in regard to excisions in the continuity of long bones applies with redoubled force in excisions performed on this bone.

Amputations at the knee-joint.—This operation has been frequently performed during the war. The returns, so far as have been furnished, give 132 cases, of which 52 recovered and 64 died. In 6 cases, amputation of the thigh was subsequently performed, with 3 recoveries and the same number of deaths. In 10 cases the result is still undetermined. As encouraging as the figures appear,

* All the medical and hospital supplies were seized by order of Brig. Gen. Rains for the use of the rebel sick and wounded. Our own patients were compelled to suffer all the agonies attendant upon mutilation, and the operative processes consequent thereupon, without the aid of medical relief.

the results from the primary operations alone are still more gratifying. Of 47 cases of primary amputation at the knee-joint, 31 recovered and 16 died, which gives a per centage of mortality of 34.9, which is smaller than in primary amputation at the lower third. The records of this operation, as shown by the Crimean statistics and by M. Malgaigne, indisputably prove that the mortality in amputations augments in exact proportion as the incisions approach the trunk. The objection urged against amputations at the knee-joint, that the resulting stump is ill-adapted to the use of an artificial limb, is silenced by the results obtained by Hudson and other manufacturers, who distinctly declare that the stumps from the operation at the knee-joint give a base of support far better than any possibly to be gained in thigh stumps. M. Legouest condemns the operation of disarticulation at the knee as an objectionable procedure, more grave than amputation in the continuity of the femur; but it is probable that the more extended experience of the late war will lead surgeons to share the convictions of Baudens, Macleod, and Malgaigne that this operation is altogether preferable to amputation at the lower third of the thigh.

Excisions of the knee-joint.—Previous to the American war there were but seven recorded examples of excision of the knee for gunshot wounds. These were: the elder Textois case* (in 1847); the Schleswig-Holstein case† (1851), in which Fahle operated by Stromeyer's direction; Mr. Lakin's case‡, in the Crimea (1855); the Alumbaugh case, § in the Indian mutiny (1857); the case of a man in the London hospitals, wounded by bird-shot || (1861); a similar case at Birmingham ¶ (1861); and, lastly, Verneuil's case.** Of these, Verneuil's and the Birmingham cases were the only successful ones, and the patients were lads of seventeen and nineteen.

Modern surgeons have bravely striven to escape the deplorable necessity so often forced upon them to amputate at the knee-joint,

* Fuch's Dissertat., 1854, and O. Heyfelder's *Traité des Resections*, E. Beckel, 1863, p. 106.

† Friederich Esmarch, *Die Resectionen nach Schusswunden*, Kiel, 1851.

‡ Macleod, *Notes on the Surgery of the Crimea*, p. 349.

§ *Edinburgh Medical and Surgical Journal*, October, 1860.

|| *The Lancet*, April 20, 1861.

¶ *Gazette Hebdomadaire*, November, 1862.

** *Medical Times and Gazette*, May, 1861.

and have embraced the substitute recommended by Legouest and Macleod, to employ excision in cases in which the injury to the epiphysis is inconsiderable, the patient young and robust, and the requisite hygienic and surgical resources for careful after-treatment attainable.

Unhappily, in an active campaign in the field these circumstances are rarely met in conjunction. This operation during the late war was performed eleven times, with two successes and nine deaths. Three partial excisions of the knee-joint have also been reported, the patients surviving the operations twelve, fifteen, and eighteen days.

Amputations of the leg.—Of 3,302 amputations of the leg that have been recorded, the results have been ascertained in 2,348. The ratio of mortality, so far as is known, is 26.02. The operation just above the malleoli, sometimes called Lenoir's operation, has not been very largely practiced, but it has given some excellent results, and its mortality rate is surprisingly small. The majority of the cases were amputations at the middle of the leg and at the place of election, and the circular method was the one generally used. Larrey's operation, through the head of the tibia, has been done but little; though by an examination of the specimens at the Army Medical Museum, the conviction exists that this procedure might have been profitably substituted in some instances for disarticulation at the knee-joint or amputation at the lower third of the thigh. Of the 1,737 patients so far known as having recovered after amputation of the leg, 1,057 have been furnished with artificial limbs.

Excisions in the continuity of the tibia and fibula.—The excisions following gunshot fracture in these bones, according to table before mentioned (page 711), are eighty-four excisions in the continuity of the tibia alone; ninety-three in the fibula; eight in the continuity of both tibia and fibula. The mortality rates, so far as ascertained, after excisions of the two bones is less than after amputation; but the number of cases in which the result is still pending is unusually large. In two cases of resection of the tibia and fibula (upper third) performed by Assistant-Surgeon Turner, U. S. V., in charge of hospital transport *City of Memphis*, and who were forwarded to Mound City Hospital, both were attacked with gangrene of the parts. In both cases I performed *secondary* amputation in the lower third of the femur. Both died; and I may take occa-

sion to remark that no encouragement was given in either case, the amputation being done as the only chance of saving life, remote as it was considered.

Amputations at the ankle-joint.—The records of these cases are far from complete; in the terminated cases, Syme's method was employed in twenty-five cases; Roux's method in two cases, and Pirogoff's in nine cases. Several casts and photographs of well-rounded stumps according to the latter method were deposited in the Army Medical Museum, but the operation appears to be regarded with disfavor. Baron von Horronitz, Surgeon-in-chief of the Russian marine, in his recent visit to this country, stated that Pirogoff himself had abandoned it, finding the segment of the os calcis likely to become necrosed.

Excisions of the ankle-joint.—Of twenty-two cases recorded, eight were excisions of the tibio-tarsal articulation, and the remainder were nearly all ablations of portions of the tarsal bones. Of eighteen terminated cases, twelve recovered and six died.

Five of the fatal cases were reported by Surgeon R. B. Bontecou, U. S. Volunteers, the operations being described as "excisions of the ankle-joint" in four cases, and in one as "excision of the lower end of the tibia and head of astragalus." They were all secondary operations, performed on account of perforation of the ankle, with comminution by musket-balls, and seem to have been formal resections, and not mere gougings of necrosed bone. The results, therefore, are very discouraging. The sixth case was reported by Surgeon J. A. Lidell, U. S. Volunteers, and consisted in a secondary excision of portions of the calcaneum and astragalus. Surgeon Whitehill, U. S. Volunteers; reported a complete excision of the calcaneum and astragalus, with a prospect, two months after the operation, of a useful limb. Assistant-Surgeon Billings, U. S. A., removed the external malleolus, the entire astragalus, and a portion of the scaphoid, and eight months after the operation the patient could walk with the aid of a cane.

Surgeon Billings extracted the ball and fragments of the astragalus in the case of a negro boy, with a ball lodged in that bone, and the patient recovered without ankylosis, and was able to walk with no perceptible limp two months after the operation.

Surgeon Lidell extracted the shattered fragments of the cuboid and external cuneiform with satisfactory results. Thus it appears

that the judicious use of the gouge and bone-forceps is admissible in gunshot wounds of the ankle-joint, but that the formal excisions are rarely successful.

Amputations of the foot (partial).—Of the 160 recorded cases, 119 were terminated, with a mortality of 9.24 per cent. The tarso-metatarsal operation of Hey or Lisfranc was performed 25 times, and the medio-tarsal operation of Chopart 45 times. The remaining cases were ablations of toes, with one or more of the metatarsals. In *five* cases of amputation of the foot at the medio-tarsal line of Chopart, *four* were completely successful; and in one case I was compelled to make a secondary amputation at the middle third of the leg, which proved finally successful. I made quite a large number of operations on the metatarsal and phalangeal articulations, but kept no record of the number or result. Suffice it to say, none died from the effects of the operation. The drawing up of the heel, which so frequently occurs after the operation made by Chopart's method, is shown by several casts of stumps preserved in the Army Medical Museum.

Amputations of the toes.—Of 784 cases of these minor operations, six were fatal. Tetanus supervened in one case, and phlegmonous erysipelas invaded the leg in another. In the four remaining cases, the fatal termination was due to causes foreign to the operation.

PRIMARY AND SECONDARY AMPUTATIONS CONSIDERED.

Surgical authorities are even yet divided upon the question of primary and secondary operations following gunshot wounds. While some excellent surgeons adhere to the secondary operations, my own opinion, based upon a large experience in both classes, is most emphatically in favor of primary amputations; the sooner after injury the better is the chance for recovery. Whenever I could get access to the wounded during a battle, my judgment always was to operate *immediately*, using the time of collapse or nature's anaesthesia as the most opportune period, without reference to the reaction upon which so much stress is placed in surgical works; and the best results have followed in those cases where the operation was performed before reaction set in at all, and while the nervous system was laboring under natural anaesthesia from the

shock. In such cases the shock of the operation is less severe and the consecutive reaction less violent. In secondary operations, when reaction follows artificial excitement, the nervous system is made proportionally sensitive, according to the amount of stimulants administered, and the depression caused by anæsthesia in this condition produces a corresponding prostration of the vital forces, which, with the shock of injury, subsequent operation, and loss of blood consequent upon the artificial reaction, are, to my mind, cogent reasons against the delay so often practiced by surgeons. I have operated scores of times, in the early portion of my army career, after waiting for artificial reaction, then administered anæsthetics, and concluded the operation; but I have observed in such cases that the recovery was slower and less certain than in the same operations performed during the period of shock; besides this, they were more prone to take on the various complications and derangements consequent upon a prostrated vital energy than in the cases where the operation followed immediately upon the injury received, and before reaction set in.

The shock of operation is far less severe in an *immediate* amputation, when the nervous system is obtunded by the injury, than it is when time is permitted the system to recuperate, and then to receive the additional shock of anæsthesia and operative procedure. In the *primary* or *immediate* operation, the torn, ragged, and lacerated structures are converted into a healthy and clean-cut surface, without the system knowing it, as it were; now, when reaction takes place, and no other injury is to be imposed, the recovery is more marked and permanent. In the *secondary* or consecutive amputation, just the reverse takes place, and according to my experience, the chance of success is in a direct ratio with operative delay. Many authorities, as I am aware, teach that amputations for gunshot wounds should be performed *primarily*; others advise *secondary* operations, and exceedingly few recommend operative procedure during the stage of prostration, or shock of injury. Gross * says that "amputation should never be performed in wounds of any kind until after reaction has taken place. The proper treatment," he remarks, "is recumbency, with mild stimulants, sinapisms to the extremities, and other means calculated to re-excite

* Gross' Surgery, Amputation in Wounds, p. 395.

the action of the heart and brain." Miller's† Principles of Surgery, covering nearly the same ground, says: "The shock having passed away, as usually happens in a few hours, the part is taken away during the interval of systemic repose, between depression and excessive reaction." Mehee,‡ Lassus,§ M. Delatouche, Leville,|| and Faurre¶ strongly advocate the secondary operation** in preference to the primary. M. Larrey†† opposes the secondary operation, and says "that in the American war the French surgeons, by deferring amputations, lost almost all their patients, while the Americans, by amputating *immediately*, saved almost all theirs, without scarcely an exception." In the affair at Newbourg, Percy (Gouraud, Oper. Cit., p. 8) relates the performance of ninety-two *immediate* operations, and cured eighty-six of them. M. Larrey (ibid., p. 8) cured twelve out of fourteen; and out of sixty wounded in the naval action of January 1, 1794, who were amputated *immediately*, two only died. English surgeons assert that, after the battle of Toulouse, *immediate* amputation succeeded in thirty-seven cases out of forty-eight, while in those in whom the amputation was deferred, twenty-one died out of fifty-one. At the attack upon New Orleans, the proportions were still more favorable, for out of forty-four amputations of the first kind, seven only perished, while out of seven of the second, two only were cured.

M. del Signore (archiv. Gen. de Med., tome xxi, p. 298) says that after the battle of Navarino, out of thirty-one *immediate* amputations, he lost but one.

Velpeau observes (Operative Surgery, vol. ii, p. 93): "Upon the whole, therefore, amputation should be performed *immediately*, that is, in the first twenty-four hours and before symptoms of reaction have commenced; in a word, as soon as possible, so long as there is no other chance to save the patient. *The stupor and insensibility observable in some cases of wounds are not by any means positive counter-indications.*" Sir George Ballingall (Outlines of Military Surgery, p. 337) is of the opinion that

† Treatment of Gunshot Wounds, p. 593.

‡ *Qualité de l'Amputation des Membres*, Paris, 1800.

§ *Traité des Fractures de Pott*, p. 181.

|| *Amputation dans les Cas. de Fract.*, 1814.

¶ *Soc. Méd. de Emul*, tome v, p. 192.

** *Paix de l'Acad. de Chirurg.*, tome iii, p. 337, 1819.

†† *Clin. Chir.*, tome iii, p. 518.

“primary operations, *i. e.*, those that are performed at once, and before reaction has commenced, succeed best in military hospitals.” And why not, I may add, in civil hospitals? I am not willing to admit the force of Ballingall’s reasoning in this direction. My own experience, limited, I have no doubt, in comparison with his, but nevertheless considerable, leads me to assert that, as a general principle, *primary*, or *immediate* operations, should be performed alike in civil as well as in military hospitals. The fact of the patient to be operated upon being in a civil hospital does not take away his rights to all the chances of success that attend the one in a military hospital.

Dr. Valentine Mott, my honored preceptor, the great and incomparable American surgeon, coincides with the views advocated by Velpeau in favor of *immediate* operations; “the only question to be determined,” he says, “is *whether an amputation is or is not necessary.*” Hutchinson denies the possibility of *collapse following injury to a degree forbidding amputation, and advocates immediate amputation.* With such a weight of testimony, the question of immediate operation, that is, during the existence of shock after injury, is, therefore, in my opinion, proven to be the *true time* for performing amputation or other important surgical processes, whenever the nature of the case demands operative procedure. My own experience, which is quite extensive, has demonstrated the fact that such cases always do better, there is less risk of subsequent complications, and they make more rapid recoveries than under the old process of waiting for reaction, produce anaesthesia, and then operate.

Having established the principle that “if an operation is necessary to save life,” it should be done immediately, I propose to consider the aphorism of Baudens, who says that “every fracture of the femur from gunshot demands immediate amputation.” I am too strongly tainted with the principle of conservative surgery generally to recommend amputations of “every fracture of the femur;” and such an unqualified assertion as this demands the rebuke of every practitioner of the chirurgic art; and to prove its utter untenableness, I will present the following table of statistics taken from the records of Mound City Hospital, a copy of which was forwarded to the Medical Department at Washington, D. C. This table embraces only a *small portion* of the statistics of the

hospital under my charge, but it abundantly proves the incorrectness of Baudens' views on this point:

TABLE OF STATISTICS.

John F. Waller, 7th Iowa vols., com. fract. of arm; up. third; no operation; recovery.			
John Walgamoth, " " " " " " " "	elbow-joint;	"	"
John Kennedy, " " " " " " " "	ankle;	"	"
Jas. R. Howard, " " " " " " " "	arm; amputation; recovery.		
Thos. Lamb, citizen, " " " " " " " "	knee-joint; resection; death.		
John S. Taylor, " " " " " " " "	elbow-joint; no operation; recovery.		
* Patrick Welsh, " " " " " " " "	thigh, mid. third; no operation; death.		
* Capt. Abbott, 11th Ill. vols., " " " " " " " "	thigh, upper third; " recovery.		
Chas. Huffman, 7th " " " " " " " "	leg, middle third; amputation; " "		
George Smith, seaman, " " " " " " " "	scapula; resection; recovery.		
R. W. Cool, " " " " " " " "	skull; operation; " "		
Wm Casey, 1st Mo. vols., severe shell wound; no operation; death.			
Samuel Ritchie, 7th Iowa vols., compound fracture scapula; partial resection; recovery.			
Wm. Miller, compound fracture scapula; partial resection; recovery.			
* P. M. Hammet, " " " " " " " "	thigh; upper third; no operation; recovery.		
Chas. Welburn, " " " " " " " "	pelvis; no operation; death.		
H. Gregory, " " " " " " " "	tibia; " recovery.		
* D. Clanner, " " " " " " " "	thigh, upper third; no operation; recovery.		
David Wallin, 7th Ill. vols., wound of upper lobe of left lung; no operation; recovery.			
Patrick Welsh, compound fracture knee-joint; no operation; death.			
S. McCombs, 23d Ill. vols., compound fracture leg; no operation; recovery.			
J. R. Kell, compound fracture occipital bone; operation; recovery.			
* Chas. Cook, " " " " " " " "	thigh, middle third; no operation; recovery.		
W L. Wood, wound upper lobe right lung; no operation; death.			
O. Schradler, 25th Ky vols., compound fracture arm; no operation; recovery.			
Jas. Carpenter, 45th Ill. vols., " " " " " " " "	leg; amputation; death.		
G. Arnold, Capt. 24th Ohio vols., wound of upper lobe of left lung; no operation; recovery.			
Alex Allen, compound fracture of leg; amputation; death.			
* Ed. Hawkins, 62d Ill. vols., compound fracture thigh, lower third; no operation; recovery.			
Chas. Mervin, 41st Ill. vols., " " " " " " " "	cranium; operation; recovery.		
T. H. Simmons, 14th Ill. vols., wound of upper lobe of left lung; no operation; recovery.			
A. A. Veach, 28th Ill. vols., " " " " " " " "	" " " " " " " "		
G. W. Crabtree, 11th Ill. vols., " " " " " " " "	transverse colon; " "		
Dennis Bryan, 18th Ill. vols., compound fracture lower jaw; resection; " "			
* Wm. Randolph, 25th Ind vols., " " " " " " " "	thigh; amputation; death.		
J. Strickland, 8th Ark. vols., " " " " " " " "	upper jaw; resection; recovery.		
G. W. Spaulding, 52d Ind. vols., " " " " " " " "	clavicle; " death.		
* S. Suhler, 32d Ind. vols., " " " " " " " "	thigh; no operation; recovery.		
H. J. Smith, 7th Iowa vols., " " " " " " " "	clavicle; resection; " "		
* W. H. Fell, 11th Ill. vols , " " " " " " " "	thigh, mid. third; no operation; recovery.		
Oscar Strait, 41st Ill. vols., " " " " " " " "	leg; no operation; recovery.		
* W. M. Godfrey, 7th Iowa vols , " " " " " " " "	thigh; no operation; death.		
* George Addy 7th Iowa vols., " " " " " " " "	thigh; amputation; death.		
C Scriber, 22d Ill. vols., " " " " " " " "	leg; no operation; recovery.		
* L. G. Bishop, 20th Ill. vols., com. fracture thigh, upper third; no operation; recovery.			
* Wm. Philo, 20th Ohio vols., " " " " " " " "	" middle third; removed to St. L.; doing well.		
Caspar Schied, 2d Ill. cav., " " " " " " " "	arm; amputation; recovery.		
* George Lewis, 20th Ill. vols., " " " " " " " "	thigh; no operation; recovery.		
* J. P. Thompson, 12th Iowa vols , " " " " " " " "	thigh, lower third; no operation; death.		
R. A. Smith, 13th Illinois vols , " " " " " " " "	arm; amputation; recovery.		
W. W. Johnson, compound fracture arm; amputation; recovery.			
John Henry, 13th Ill. vols., compound fracture arm; amputation; recovery.			

Thus, it will be observed that out of *fifteen* cases of compound

fracture of the femur, with more or less comminution of the bone, marked with an *, *four* died, amputation having been performed *secondarily*, *ten* recovered who were left to the conservative process, and only *one* died during that process. It will be seen, therefore, that the aphorism of Baudens, that "every fracture of the femur from gunshot demands immediate amputation," does not hold true in the treatment of the cases referred to. The mode of treatment pursued in the above cases was extension and counter-extension, after the method of Dr. Swinburne, Albany, New York. Having employed the various apparatus recommended by surgical authorities, I have no hesitation in affirming that Swinburne's treatment is preferable to all means of which I have at present any knowledge. The chief points of its superiority are that it is easily improvised; the extension and counter-extension are more equally kept up; dressings are more readily applied; the limb is more convenient of access; the fractured ends of bones are more perfectly retained *in situ*, and the movements of the patient are less liable to disturb the healing process.* The *four* cases who died from secondary amputation I have no doubt would have recovered if *primary* amputation had been performed on the field *immediately* after injury, as they were all patients of more than ordinary vigor of constitution, and resisted for weeks the prostrating influence of their wounds.

The important question for the surgeon to decide, in the language of the immortal Mott, is "whether an amputation is or is not necessary." To decide a matter so vital requires all the skill, judgment, and forethought of the attending surgeon, and it is in the correctness of such decisions that the true surgeon ranks far above the mere operator. There is no doubt that conservative surgery may be carried to extremes, and the danger become as great as its antipode, embraced in the language of Baudens, "that every fracture of the femur from gunshot demands immediate amputation." Bilguer, Surgeon-General of Prussia, held to conservative surgery in its strictest sense, on account of the ill-success attending amputation in the earlier period of the service. He forbade amputation entirely, and the close of the war witnessed six thousand wounded, of whom the Prussian surgeons had not amputated a limb. The result of this

* In the surgical wards of the Good Samaritan Hospital, St. Louis, I employ this same treatment in fractures of the thigh, with the most satisfactory results. In no case has there been shortening of limb.

conservatism was, one-half of those with fractured extremities died; in one-half of the remainder the limbs were useless, and *eleven* are reported as astonishing cures. It will be seen, therefore, how difficult it is to mark out the proper line of treatment in all cases, and how prone we are, in avoiding the Scylla of conservatism in surgery, to run on the Charybdis of Baudens, and amputate in all cases. The gist of the whole thing lies in the judgment, tact, and forethought required to determine between those cases which demand immediate amputation, and those in which conservatism should be practiced, and which are only acquired by long experience and close observation. Cases may occur where a doubt arises as to the propriety of amputating or not. In such cases my experience is, give the patient the benefit of the doubt, and amputate at once; as Pott remarks, "it is better to live with three than die with four limbs." Whenever resection can be practiced in lieu of amputation, except in the continuity of long bones, such as the femur, tibia, fibula, and humerus, my experience is, that results were entirely more successful than in the latter method. In gunshot wounds involving either the tibia or fibula alone, I have witnessed the best results following resections; but when *both* bones were resected in any portion of their continuity, mortification and gangrene were the almost inevitable consequence. The longer the portions of bone removed, the more sure the death of the patient. Mr. Guthrie remarks that in the upper extremities amputation is rarely to be performed, and only in those cases where cannon or shell has caused the destruction of the soft parts and wound of the artery. This does not always hold good, for in my museum, collected during the rebellion, there are *two* specimens of fractured and comminuted humeri, the one five and the other four and a half inches in length, made by a Minie ball, and in the continuity of the bone. In both cases I performed amputation high up, just below the tuberosity of the bone, and both recovered. Both Larrey and Guthrie claim that resection should be limited to the head and not shaft of the bone, and here my experience agrees with these authorities. Stromeyer remarks that of *eight* such cases left to nature, *five* died, and of *nineteen* resections, *seven* only died, and these from pyemia, or too late operations. My own experience leads me to state that injuries of the shaft of bones in the upper are analogous to those of the lower extremities, except in the rate of mortality. If the

injury to the soft parts is severe, the arteries and veins lacerated, amputation is our only safe course. In all injuries of joints in the upper extremities, I agree with Guthrie that "amputation is rarely to be performed."

Saber and bayonet wounds.—The number of saber and bayonet wounds that have come under treatment during the war has been comparatively small; 105 cases of the former and 143 of the latter comprise nearly all that were reported during the first three years of the war. Of these wounds, two-thirds were received in action and the remainder were inflicted by sentinels or patrols. There are eleven deaths reported from sword wounds and six from bayonet wounds. At the Army Medical Museum there are nine specimens of saber cuts of the cranium, one specimen of punctured fracture of the skull by a bayonet, and a preparation exhibiting a bayonet thrust through the stomach. From General Sheridan's campaign in the Shenandoah Valley, twenty-five saber wounds are reported, and from the battle of Jonesborough, in Georgia, thirty bayonet wounds. After the first battle of Bull Run, several of the wounded left upon the field were bayoneted by the insurgents.* A patient afterward brought to Georgetown received no less than fourteen stabs. A similar instance is said to have occurred after the battle of Fair Oaks. Late in the war such atrocities were very infrequent.

Tetanus.—Only 363 cases of traumatic tetanus were recorded in the register during the war, which, in proportion to the large number of wounds, is small. In the Schleswig-Holstein war, Stromeyer reported six cases among 2,000 wounded. In Napoleon's campaign in Egypt, in the Peninsular war, and in the Indian revolt, the ratio appears to have been larger than this. Among 12,094 of the British wounded in the Crimea, only nineteen cases occurred. Of the 363 cases reported, 336 terminated fatally, which the "circular" considers "satisfactory in their details of symptoms, progress, and treatment." Of the twenty-seven recoveries, the disease assumed a chronic form in twenty-three. In the four remaining cases, the symptoms were very grave. In *two*, recovery took place under the use of opiates and stimulants; in *two*, after amputation of the wounded part.

* Surgeon Joseph R. Smith's Report.

Four cases of traumatic tetanus were treated in Mound City Hospital during my term of service.

No. 1. The first patient, Wm. Young, 7th Iowa Volunteers, received compound fracture of femur at battle of Belmont, contracted tetanus nine days after amputation of the thigh, and died thirty-four hours afterward.

No. 2. The second, S. R. Burrows, 20th Illinois Volunteers, received compound fracture of thigh at battle of Donelson, and *eleven* days after amputation tetanus supervened, and death followed thirty hours after the attack.

No. 3. James Schuster, 48th Illinois Volunteers, received compound fracture of forearm at Donelson, February 16th. The limb was properly dressed with splints, rollers, etc., etc. February 24th tetanus appeared, and the patient was put immediately under the influence of chloroform, and rigidity of muscles overcome, which continued for twenty-five or thirty minutes, when the tetanus returned. Chloroform was again repeated, with the same effect. This treatment was persevered in for *fifty hours*, the spasms gradually diminishing until their disappearance altogether. From this time all tetanic symptoms passed away, and the patient made a good recovery.

No. 4. G. W. Morgan, sailor, received shell wound over the scapula. Wound suppurated profusely for eight days. Eleven days after receiving injury, symptoms of tetanus set in. As in the former case, chloroform was administered, and continued at intervals for three days, after which all evidence of tetanus passed away. Suppuration, which had almost entirely ceased upon the approach of tetanus, now reappeared, and the wound looked healthy. The patient was much prostrated, but entirely free from tetanic symptoms. Four days afterward he sank from exhaustion, the tetanus having been entirely cured. These cases were not reported, and consequently, to a certain extent, affect the results above given.

The great majority of cases cited were treated by the free use of opium, conjoined with stimulants and concentrated nourishment. Chloroform inhalations were very generally employed during the paroxysms of spasmodic contraction. Subcutaneous injections of the salts of morphia and atropia were frequently used, conjoined with the various methods of treatment of the allopathic school. Amputation, the division of nerves, and the

extirpation of neuromata in stumps, were the surgical means sometimes employed.

Autopsic examinations frequently showed great congestion of the brain and spinal cord.

Secondary hemorrhage.—Cases have been reported in three classes: bleeding proceeding from a stump, from a gunshot wound, or from an artery previously ligated in its continuity. Cases of the latter class have not been placed upon the registers of secondary hemorrhage, but the repetition of the bleeding has been included under the head of ligations. Of the two first classes, 1,037 cases have been examined and recorded on the registers of secondary hemorrhage. Of these, 387 were cases of secondary bleeding from a stump, and 650 were cases of secondary hemorrhage from gunshot wounds. Of the first class, 233, or 60 per cent., terminated fatally; of the second, death took place in 330 cases, or 51 per cent. In the 1,037 recorded cases, the femoral artery was ligated ninety-three times for bleeding from stumps, and forty-five times for bleeding from wounds; the subclavian was tied five times for bleeding after amputation at the shoulder-joint, and six times for hemorrhage from gunshot wounds in the axilla. The common carotid was ligated fifteen times for hemorrhage from the deep branches of the internal carotid. Amputation was practiced seventy-eight times for secondary bleeding from gunshot wounds, and reamputation was performed fourteen times, when other means of arresting hemorrhage from stumps had failed.

During my time of service in the army, I performed *five* deligations of arteries from secondary hemorrhage, three of which occurred during the conservative practice of saving the limbs referred to in table, page 723, and *two* that took place the second week after amputation. One of the patients of the first class died of gangrene, and amputation was performed in the remaining case with successful result. The deligations were: *one axillary, two humeral, two femoral* (upper third). These cases, not having been reported, are not included in the statistical returns.

The 387 cases of secondary hemorrhage from stumps were chiefly examples of arterial bleeding. In 95 cases the hemorrhage was, perhaps, mainly venous, and was checked by elevating the stump, or applying cold water, ice, pressure, or the solution of the persulphate of iron. When the hemorrhage was arterial, the most common

practice was to tie the main vessel, at the second bleeding, as near as prudent to the end of the stump. In a few cases, the artery was successfully tied on the face of the stump. The results of tying the vessel *above*, according to Anel's method, were very unfortunate.

A review of the 650 recorded cases shows that in the early part of the war many surgeons, not sufficiently impressed by the precepts of Bell and Guthrie, frequently treated secondary hemorrhage from gunshot wounds by tying the main trunk at a distance from the wound, even when the bleeding occurred at a comparatively early period. Later in the war, however, it became almost the universal practice to secure, if possible, both ends of the bleeding vessel at the seat of injury, and some brilliant examples are on record where this was accomplished in wounds of the posterior tibial or popliteal, when limbs had become infiltrated and swollen, and the difficulties of the operations were immense.

Ligations of larger arteries.—The following table exhibits the number of cases of ligation of the larger arteries during the war:

NAMES OF CASES.	Number of cases recovered	Number of cases died	TOTAL	Ratio of mortality.....
Common carotid.....	12	37	49	75.71
External " .....	.....	2	2	100.00
Subclavian.....	7	28	35	80.00
Axillary.....	3	21	24	87.50
Brachial.....	53	11	64	17.18
Radial.....	12	2	14	14.28
Ulnar.....	9	2	11	18.18
Common iliac.....	.....	3	3	100.00
Internal " .....	.....	2	2	100.00
External "	2	14	16	87.50
Femoral.....	25	83	108	76.85
Profunda.....	1	6	7	85.71
Popliteal.....	4	12	16	75.00
Anterior tibial.....	11	6	16	31.25
Posterior "	13	6	19	31.57
Peroneal.....	.....	2	2	100.00
All others	11	4	15	26.66
Total.....	163	240	403	.....

Of the three cases of ligation of common iliac, one was performed on account of secondary hemorrhage from a branch of the left internal iliac, by Surgeon McKee, U. S. A. The hemorrhage

resulted from a gunshot wound of the pelvis, and occurred on the fifteenth and again on the twenty-third day. On the second bleeding, the internal iliac was tied; but the hemorrhage was not controlled, and the main trunk was secured, the patient surviving two days, and the bleeding not recurring. The second operation was performed by Acting Assistant Surgeon Isham, U. S. A., for a false consecutive aneurism of the anterior trunk of the right internal iliac, resulting from a bayonet stab through the ischiatic notch. Seven months after the wound was inflicted, the rupture of the sac appeared imminent, and the operation was imperative. The patient survived four days. An occluding clot, extending to the bifurcation of the aorta, was found above the ligature. There was no peritonitis. The third operation was done after an aneurismal varix, following a stab with a penknife in the left thigh, which opened a communication between the femoral artery and vein. The patient died of peritonitis in five days.

In all the 35 cases recorded of ligations of the subclavian, the artery was secured outside of the scaleni. In 16 cases the operation was on the right and in 14 cases on the left side, and in five cases the particular vessel is not mentioned. The operation was performed in 13 cases for secondary hemorrhage after amputation of the shoulder-joint, with four recoveries. In two cases it was done for primary and in 15 for secondary hemorrhage after gunshot wounds, with injury of the axillary artery, and two recoveries. In two cases the operation was performed for axillary aneurism. In two cases, with one recovery, it was required by secondary bleeding after excisions of the humerus, and in one case it was necessitated by a secondary hemorrhage after a gunshot wound, with injury of the subclavian.

Two ligations of intercostals were performed by Assistant-Surgeons Howard and Gardner, U. S. A., according to the method proposed by the former of inclosing the rib in the ligature. Dr. Howard's patient died the day following the operation, and Dr. Gardner's recovered.

The new hæmostatic process* recommended by Prof. Simpson was adopted in a few cases, with favorable results.

* Acupressure, a New Method of Arresting Surgical Hemorrhage and of Accelerating the Healing of Wounds, by James T. Simpson; Edinburgh, 1864.

The following description of a new apparatus for the extraction of bullets is from the Medical Times and Gazette:

An ingenious bullet-detector. — “A very ingenious piece of mechanism for the detection and extraction of bullets in wounds has been devised by Mr. Sylvan DeWilde. It seems that at the time Garibaldi was suffering from the effects of an undetected bullet in his limb, and pained by the fruitless efforts of operators to detect it, it occurred to several individuals of a philosophic turn of mind that electricity might very well be employed in the detection of metallic substances lodged within the human tissues. In France, M. Edmond Langlois, M. Favre, and Dr. Lecompte, of the French Army Medical School at Val-de-Grace, assisted by M. Rhumkoff, all made use of it in the elaboration of suggestions on the point. There is this manifest advantage, that the structures of the body are non-conductive — a fact that renders the action of the electric current more perfect.

“Mr. De Wilde has apparently produced the most practical result; and his instruments have been submitted to the naval and military authorities, who have made a complimentary report about them. The apparatus consists of a probe and forceps, a battery, and an alarum, contained in a box eleven inches long by three broad, and two inches and a half deep. The elements for the generation of a current, which remains constant for some weeks, are zinc and carbon. The probe, consisting of two steel wires insulated from each other, is connected with an electric horse-shoe magnet and a bell; and when (introduced into the wound) it touches the bullet, the circle is completed, and the bell rings. The forceps act on the same principle, and are intended first to detect, then to seize, the bullet. They have curved points, and not pallets or spoons. The points of the probe are kept sheathed on introduction to the wound, and not uncovered till the supposed bullet is felt. This is effected by means of a sliding tube. The advantages of Mr. De Wilde's probe over others of its kind are very marked, and the army and navy officers will no doubt find it a great aid. The probe is a sensitive artificial finger, which enters deeply into the tissues and gives the signal at once when it detects the hidden source of mischief below.”

CHAPTER X.

MAGGOTS IN WOUNDS.

The development of maggots in wounds and compound fractures is a circumstance, in a practical point of view. Such an occurrence is met with chiefly in hot weather, but they are sometimes seen in the autumn and early part of winter, in consequence of the artificial heat of the patient's apartment. In tropical climates, it is almost impossible to prevent the formation of these worms in wounds and ulcers, no matter how great the degree of cleanliness may have been. Dr. Proctor, formerly of Kentucky, now of California, speaks of these maggots as one of the great evils that surgeons in the American army had to contend with during the war with Mexico. The same difficulty was experienced during the late war of the rebellion. Wounds carefully cleansed and dressed in the morning, were found the next morning to contain large numbers of these parasites; and if not kept properly and thoroughly cleansed, they speedily collect in incredible numbers, and grow to a prodigious size, their diameter oftentimes equaling that of a goose-quill, while in length they range from four to nine lines. The wounded viewed their appearance with no little alarm and horror; and I have seen the bravest and most fearless soldier sicken with terror and dismay at the presence of these disgusting objects, and apparently willing to yield his life without hope or a further struggle. They often dig deep into the tissues below, and are frequently productive of intense pain and distress.

Fortunately, these offensive things are not often seen in civil practice, where patients can enjoy all the conveniences and comforts of home; it is also rare to see them in public institutions; still, the fact that such results do follow uncleanness in wounds during warm weather, is sufficient to attract the attention of practitioners to a result that is so exceedingly prone to follow a want of proper attention to the dressings of every variety of wound.

The best preventive of these parasites is continued and unceasing cleanliness, with frequent renewal of the dressings and burying the affected parts in light bran, so as to place them beyond the reach of flies, which under almost any other mode of management are sure to find their way to the wounded surface. Moisture and high temperature are the causes which most rapidly conduce to the formation of maggots. The means which prove most destructive to them are carbolic acid, creosote, and the alkaline solutions, such as the chlorinate of soda. I have seen the best effects follow the use of the carbolic acid, the maggots disappearing quickly after its application to the wounded surface. The strength of the solution used was one dram of the acid to one quart of water. If the external dressings are well saturated with the solution, the flies will not deposit their larvæ upon them. The most horrible suffering has been known to result from the development of maggots in the nose, from the accidental deposition of larvæ during a fit of intoxication. Dr. Bumford, who formerly practiced in Texas, communicated the particulars in the case of a man who perished from the effects of maggots found in the nasal cavities and frontal sinuses, from which it was found impossible to dislodge them by the best-directed means. The patient suffered intense agony, and died in raving delirium.

Dr. Comstock, of St. Louis, Mo., has found the ointment of *elder bark* one of the most effectual remedies in destroying these parasites.

Carbolic acid and *glycerine*, one scruple of the acid to an ounce of glycerine, is an exceedingly valuable application to destroy maggots in wounds.

PART VIII.

DISEASES OF THE NERVOUS SYSTEM.

CHAPTER I.

TETANUS.

Tetanus is essentially a nervous disorder, characterized by painful and continued contraction of the muscles, and may occur at any time after the infliction of an injury. It is to be regarded as one of the most serious complications of injuries, especially of gunshot wounds, though it often supervenes on punctured, lacerated, and other wounds implicating nerves and fasciæ. When arising from injury, which is the cause in the great majority of cases, it is known as **Traumatic Tetanus**. When dependent on constitutional disturbance, occasioned by exposure to cold and wet, the presence of irritating ingesta, uterine irritation following abortion, etc., it is called **Idiopathic**.

Etiology.—Tetanus is often developed from very slight causes: thus, it has been known to result from a change of temperature, as being exposed to a draught of air while the person is very warm; from laceration of a small nervous branch; from puncture, as with a fork or nail, or from a bruise; but notwithstanding it is more likely to follow lacerated and punctured wounds than those which are clean-cut, still it may occur as a result of surgical operations, however skillfully performed. In the following nineteen cases reported by Macleod,* it is clearly shown that this affection is not dependent on any particular variety of injuries for its develop-

* Surgery Crimean War, p. 154.

ment: In three it followed amputation; in three, on balls lodged in bones; in four, flesh-wounds; one, penetration of chest; one, contusion of the face; one, a wound of the hand; one, a needle broken in the heel; one, on exposure of a suppurating wound to cold air; one, an injury of the foot; one, on a compound fracture; and in one, an injury to the ankle. It is, however, especially apt to occur in feeble and debilitated constitutions, and hence may result from any cause having a tendency to impair the vigor of the nervous system.

Varieties.—There are several varieties of this affection, named according to the muscles chiefly implicated; thus, where the spasm attacks the muscles about the neck, face, and jaw; it receives the name of **Trismus**, or **Lockjaw**; if the patient be bent backward by contraction of the spinal muscles and the flexors of the lower extremities, it is called **Opisthotonos**; when the body is bent forward, **Emprosthotonos**; and when sidewise, **Pleurosthotonos**.

Symptoms.—The symptoms first observed consist in an uneasiness and stiffness in the muscles about the temples, jaw, and neck, rendering the patient unable to open his mouth widely. This condition is succeeded by a peculiar expression of countenance; the features are fixed or convulsed, giving the countenance an aspect of pain and anguish. The spasms are often of a jerking character, but are never noticed in the parts injured. The involuntary muscles next become affected, producing difficulty of breathing, with spasmodic pain in the region of the diaphragm and stomach; the abdomen becomes violently contracted and knotty, which is succeeded by constipation and retention of urine. The intellectual faculties remain undisturbed; the pulse natural or very slightly increased in frequency, which is due to muscular contractions rather than any febrile action. The symptoms become more and more violent as the disease continues, death resulting from exhaustion, consequent on the frequency of the tetanic spasms, in from two to fourteen days.

Diagnosis.—The only affections likely to be confounded with tetanus are hydrophobia and myelitis. It resembles the former in the difficulty of swallowing, and aggravation from very slight causes; but while the spasms peculiar to tetanus are continuous, in hydrophobia they are intermittent, and confined to the region of the throat; in tetanus, also, the mind remains clear, while hydrophobia is attended by more or less delirium.

The diagnosis from myelitis is readily made in view of the fact that, in the latter disease, there is high febrile reaction, with a continuous, burning pain in the back, often accompanied by paraplegia—conditions which are not met with in tetanus.

Pathology.—Post-mortem examinations have thrown little light on the nature of this disease. Usually, however, there is more or less congestion of the brain and spinal cord, with an effusion of bloody serum into the ventricles and in the subarachnoid space. This condition of the brain seems to be functional rather than organic, as the appearances do not correspond with marked inflammatory action. Erichsen remarks that the only morbid condition that is constantly found is a degree of inflammation of a nervous twig leading from and implicated in the wound that has occasioned the disease.

The most minute examination ever made with the microscope, writes Smith, having failed to detect any organic change sufficient to account for the symptoms of tetanus, its true pathology is yet a vexed question. There are, however, many pathologists who explain the progress of traumatic tetanus by supposing that the original irritation of the nerves of the affected part is transmitted to the great nervous centers, where it develops a disordered functional action, which first shows itself by such excitation of the motor nerves as produces continuous spasm of the muscles of the face, the neck, trunk, and extremities, which continues till their excitability is destroyed, and death closes the scene, either as a result of pure exhaustion from want of nourishment, or from apnoea consequent on spasm of the muscles of the glottis, or even of the diaphragm and heart.*

Treatment.—In the treatment of tetanus, the object of the surgeon should be to remove, so far as possible, any or all causes that have operated toward inducing the disease, or which may continue to keep up a source of irritation after it has been developed. The causes thus acting may be of the following nature: the presence of irritating spiculæ of bone, of rust, dirt, or any foreign matters in contact with the nerves and tendons. It is true that when once tetanic excitement has been set up in the spinal cord, it has a tendency to continue, and can not be removed by the mere abstraction

* Smith's Surgery, vol. i, p. 472.

or cessation of the local irritation that gave rise to it in the first instance. It is nevertheless true that other treatment will succeed best after all local irritation has been removed; for so long as this continues to keep up the centric nervous disturbance, no general means can be expected to succeed, as they will not only have to combat already existing disease, but also to overcome the continuous excitement maintained by the local disturbance. The division of an injured nerve that has been punctured or lacerated has occasionally proved successful. When there is reason to suspect the presence of a foreign body in a cicatrized wound, after tetanic symptoms have set in, it is best to cut down upon and extract, if possible, the offending material. In a case of tetanus following injury of the supra-orbital nerve, Larrey divided it entirely, and cured his patient. In another case following a punctured wound caused by a rusty nail entering the sole of the foot, a complete cure was made by dividing the posterior tibial nerve. In those cases in which no special nerve appears to have been injured, Liston recommends making a Λ -shaped incision down to the bone and above the part, insulating it completely. *Amputation* of the wounded portion has sometimes been performed with an occasional good result; still it is to be hoped that few surgeons can be found who are so utterly devoid of all surgical judgment, not to say human sympathy and feeling, as to remove a leg or an arm on the approach of tetanus, and certainly none after the disease has been fully established.

*Hypodermic Injections.**—"Among the recent suggestions for the relief of tetanus is that of Pescheux, of France, to produce the poisonous effects of *atropia* by injecting ten or twelve drops of a solution of the sulphate of atropia into the areolar tissue of the front of the neck, near its median line. In the case reported in the *Gazette Hebdomadaire*, the symptoms of atropia poisoning soon became well marked. When these subsided, the tetanic symptoms had almost disappeared, deglutition becoming easy, and the muscular rigidity much lessened. A second injection in the evening dissipated what remained of the tetanic symptoms."

Ice.—Dr. Carpenter, of Long Island, New York, reports two cases of traumatic tetanus successfully treated by the application of ice to the head and the whole length of the spinal column. The ice

* Smith's Surgery, vol. i, p. 473.

was applied from ten to thirty minutes each time, with intervals of from two to eight hours, followed by immediate relief, the spasms disappearing in twenty minutes from application.

Chloroform.—Dr. Henkle, of Lancaster county, Pa., reports a case of tetanus cured by the application of chloroform along the spine and to the epigastrium, renewing the application every hour or two, according to the urgency of the symptoms.

In the *constitutional treatment* of the disease, it is necessary to bear in mind that tetanic paroxysms give an appearance of false strength to the patient, and are a principal source of danger and death, from the fatigue induced by the energy of the muscular movements and the consequent want of rest. The remedies best adapted to meet the various indications as they are presented in the disease are: *aconite*, *ammonium carb.*, *angustura*, *arnica*, *acid hydrocyanic*, *arsenic*, *belladonna*, *camphor*, *cicuta vir.*, *conium mac.*, *cuprum met.*, *hyosciamus*, *ignatia*, *ippecac*, *lachesis*, *lauro-cerasus*, *nux vomica*, *opium*, *rhus tox.*, *secale cor.*, *stramonium*, *veratrum*.

Aconite is useful, and has been successfully employed in trismus, with frequent alternation of redness and paleness of the face and distortion of the eyes; also in opisthotonos, when the upper and lower limbs are drawn in, the hand and thumb being clenched, the eyes drawn upward, and the face covered with a cold sweat, with twitchings in the thighs, rigidity of the muscles of the neck and jaws. Mr. DeMorgan treated a case at the Middlesex Hospital with *aconite*. The patient trod on a rusty nail, which, piercing the thin shoe, penetrated the ball of the foot. The nail was extracted, the wound bled but a little, and healed in a few days. On the seventh day, stiffness began in the neck and lower jaw; on the seventeenth day, well-developed tetanic symptoms set in; a hard cicatrix in the sole of the foot was excised. Under the use of strychnine the spasms increased, and finally terminated in severe opisthotonos. On the twenty-first day of the case, five drops of the tincture of *aconite* were given every two hours, then eight drops. This continued seven days; dose then every four hours, and next day every six hours. The symptoms diminished in severity as soon as the *aconite* was given, and progressed gradually but slowly. First the general spasms and opisthotonos ceased; then the convulsive twitchings of the extremities lasted for two or three days longer; on the thirty-second day he could

sit at the table and separate his teeth half an inch; and on the fifty-third day he could walk about. The diet throughout was strong beef-tea, brandy, etc.

Arnica is useful in cases of tetanus arising from wounds, though it has proved most beneficial, says Helmuth, in those cases "where it has been employed after the use of some other medicine. In a case of trismus, with opisthotonos, arising from a wound in the leg, after the violence of the disease had been abated by *mercurius*, the cure was completed by two doses of *arnica*, 12." *Arnica* should also be applied to the wounded surface externally, as well as administered internally; or it may be given from the first when there are short, panting breathing, jerks and shocks as if produced by electricity, tremor of the limbs, etc.

Acid hydrocyanic, in tetanic spasms, with lock-jaw, bloating of the face and neck, protrusion and glistening of the eyes, immobility and dilatation of the pupils, bluish-red color of the face, frequent pulse, rigidity of the limbs, the trunk being bent either forward or backward, the convulsions depending upon a congested state of the cerebral vessels. These convulsions are accompanied by, and in a great measure depend upon, a congested condition of the cerebral vessels.

Ammonium carb. is a useful remedy in tetanic or epileptic convulsions arising from cerebral irritation or violent cerebral congestions. It may be used to rouse the patient in many forms of convulsive action, thus preparing the way for constitutional treatment.*

Belladonna is adapted to many forms of tetanic spasms, when the convulsions are partial: shivering and trembling of the limbs; spasmodic, constrictive sensations in the epigastrium, accompanied with shortness of breath; anxious and distressing feeling in the chest; drawing and stiffness in the neck and spine; spasmodic contractions in the tongue; vertigo and yawning; painful stiffness of the muscles of mastication; contortion of the eyes; paroxysms of stiffness and immobility of all the limbs, aggravated by the least contact; insensibility and rattling breathing; spasmodic inclination of the head and body to the left side; paroxysms of rigidity and immobility of all the limbs or of a single limb, sometimes accom-

* Hempel's *Materia Medica*, vol. ii, p. 67.

panied with insensibility, distension of the cutaneous veins, red and puffed face, full and quick pulse, and profuse sweat; trismus, with painful constriction and narrowing of the fauces; oppression of the chest; labored, irregular breathing; delirium, and stupor.

Camphor may be used for tetanic spasms; loss of consciousness; limbs fixed and extended; head drawn to one side; lower jaw rigid and gaping; lips drawn inward; unceasing distortion of the muscles of the face; coldness over the whole body; oppressed, anxious, panting breathing. Experiments have shown that camphor induces vertigo, marked signs of congestion, with derangement of the intellectual faculties; in poisonous doses the cerebral symptoms overshadow those of the spinal group. *

Cicuta virosa.—This is a valuable remedy in tetanus, especially in the form of *trismus*, when there is accompanying tetanic rigidity; in opisthotonos, as well as emprosthotonos, when there is leaden paleness of the face, with coldness, grinding of the teeth, foaming at the mouth, and inability to swallow; tetanic spasms of the cervical muscles; cramps and stiffness of the whole body, or with curvature of the limbs that can not be straightened. They are distinguished from the convulsions to which strychnine is homœopathic by this, that during the latter, consciousness is preserved to the last; whereas, the absence of consciousness is characteristic of the cicuta convulsions. Hahnemann says cicuta produces “a sort of cramp in the cervical muscles—on looking around, he is unable at once to turn the head back again; the cervical muscles do not yield, and if he were to use force he would feel pain.” It affects the upper portion of the cord, and has proved most serviceable in those cases which have originated from immediate irritation of the brain from injuries or other derangement of the cerebral substance.

Hyosciamus is adapted to that condition in which there are alternate convulsions of the upper and lower extremities; also, with contraction of the extremities and tossing of the body upward; also, when the eyes are staring and distorted, with spasmodic closure of lids, bluish face, clenching of the teeth; foaming at the mouth, constriction of the throat, drawing of the neck to one side, with rigidity of the hands, contortions and spasmodic curvings of the body. In trismus, when the patient is conscious, the phenomena

* Hempel's *Materia Medica*, vol. ii, p. 137.

occurs as manifestations incidental to some deep-seated cerebral disease, the symptoms showing that the cerebro-spinal axis is disturbed to its very center.

Nux vomica is probably of all other remedies most indicated in tetanic convulsions, alternating with violent concussion of the whole body, violent spasms of the whole body, with extreme rigidity of the limbs; tetanic convulsions, excited by contact, noise, or any external stimulus, with frequent and fluttering pulse during the attack, and general sweat; frightful spasms of the whole body, with opisthotonos, distorted eyes, drawing in of the muscles of the chest; spasms in the muscles of mastication; opisthotonos with feeble beating of the heart, pulse small and scarcely perceptible; spasms that are frequently preceded by violent chills and shuddering; after which there is experienced, along the track of the nerves in the limbs, formications, and painful sensations resembling the passage of electric sparks. Consciousness during the spasms does not seem to be affected. *Nux vomica* is curative in idiopathic tetanus where the spasm has its origin or takes its starting-point from the spinal marrow, or from the nervous centers immediately connected with it. It is especially indicated in persons who have been addicted to the use of stimulants. The antidote for strychnine, says Dr. Paddock, is camphor. Five grains dissolved in mucilage puts a stop to tetanic spasms, and gives time for the use of other restorative means, such as the stomach-pump, etc.

Opium is serviceable in twitchings of the facial muscles, distortion of the mouth, trismus, with irregular, difficult respiration, spasmodic trembling of the limbs, with foaming at the mouth, flushing of the face, unsteadiness of the eyes, quivering of the lips and facial muscles. "The tetanic convulsions," says Hempel, "which opium excites, are not primary manifestations of the irritating action of the drug, like the tetanic symptoms excited by *nux vomica*. The opium spasms are symptomatic of a primary irritation of the cerebral fiber, hence they are invariably preceded by manifest symptoms of violent cerebral congestion, as flushing of the face, etc., etc. The convulsive paroxysm results from the mediate irritation transmitted to the ganglionic system from the cerebral centers. The opium spasms are sometimes accompanied by general tremor, and a sensation as if the nerves should be pulled to pieces."

Stramonium is indicated in tetanic convulsions when excited by the sight of a sparkling object, as water, a candle, looking-glass, etc. During the paroxysm there are present striking symptoms of cerebral congestion. It is more especially called for in attacks of paralysis succeeding convulsions, when disturbances of the special senses and of the intellectual functions are present, or in those cases where paralysis and convulsions co-exist. *Hydrophobic convulsions* have been successfully treated with this remedy.

Some one of the preceding remedies may be required during the treatment of the case, if long continued, and should be given according to the indications demanding its use.

Woorara curare. — Woorara, when introduced into the blood, is known as an active poison, although when taken into the stomach a much larger quantity can be borne with impunity. Dr. Harly* says that its superiority consists in its peculiar power of paralyzing the *motor* and not the nerves of sense. It can be so administered as to destroy the power of voluntary motion without impairing the consciousness of the animal. In this manner tetanic convulsions have been allayed without destroying the intelligence or arresting the performance of the organic functions. It has quite lately been introduced to the profession as a remedy for tetanus by Mr. Lloyd, of St. Bartholomew's Hospital, and others, with considerable good results. Nux vomica is an antidote for woorara poisoning, as has been demonstrated by the experiments of Bernard, who poisoned ninety-seven dogs with strychnine, and antidoted the poison by throwing small quantities of woorara into the jugular vein as soon as the tetanic spasms were manifest. This was continued until the poisonous action of the strychnine was exhausted, and the animals completely recovered. Ghesini† cured a case of traumatic tetanus by subcutaneous injection of curare—as much as forty-seven grains were injected in sixty single and thirty-two double and treble injections. The treatment was commenced on the fifth day, and the patient was convalescent on the seventeenth day.

Nicotine. — Haughton cured three out of five cases with this remedy, giving one-half to two drops three to six times a day. It lowers the pulse and causes an immediate relaxation of the spasms

* Braithwaite's Retrospect, No. 41, p. 48.

† British Journal of Homœopathy, vol. xxi. p. 451.

of the muscles of expression, deglutition, respiration, back, and abdomen; cessation of delirium and relief from agonizing pain; profuse perspiration, with smell of snuff, and tendency to sleep. Mr. Tufnell, in March, 1862, cured a severe case of traumatic tetanus with *nicotine*. Fifty-six drops were administered within the space of six days, giving one or two drops at a dose, each drop being equivalent to 23.3 grains of Virginia cavendish tobacco.

Tobacco.—This agent has been successfully used in the treatment of traumatic tetanus, by direct application of an infusion of the leaves to the part affected. It is a much safer remedy than nicotine, is more readily obtained, and is said to possess all the advantages of the latter agent.

Calabar bean.—This remedy has but lately been introduced in medicine. It possesses powerful poisonous qualities,* and it is not strange if those properties should become powerful remedial agents in the cure of some of the diseased actions that afflict humanity. Should it prove as efficient in this terrible disease as the two appended cases lead us to hope, it will be hailed by the profession as the last greatest boon to suffering humanity.

Case 1.—A girl aged eleven years entered the Royal Infirmary, Glasgow, Nov. 12, 1866, with the great toe bruised and slightly cut at the side of the nail. Upon entering, she had all the aspect and expression of one laboring under trismus. Opisthotonos occurred in a very severe form on the evening of the day of her entrance, the rigidity of which was relieved by chloroform, when, at the same time, the outer half of the toe-nail was cut away from the inflamed matrix. The spasms were relieved by chloroform, but returned when its effects had passed away. On the 13th, 14th, and 15th, the condition was unimproved; the jaws were firmly locked, and the body and limbs perfectly rigid. Opisthotonos was at once induced by a cold drink, or even by touching any part of the body. The treatment consisted during these days in purgation and tincture *cannabis indicæ*. On the evening of the 15th it was determined to try the virtues of the calabar bean. “At half past two P. M. of the 15th, one square of Squire’s gelatine paper, containing the extract of calabar bean, was put on the patient’s tongue through the space left by a missing tooth. Shortly after getting it she felt

* British Journal of Homœopathy, vol. xxiii, p. 136.

easier, was more cheerful, and kicked up her heels, as she lay on the bed on her abdomen, to show the power she had over them. At 3 P. M. she got two other squares; at 7, three squares; and at 10, two more. No severe spasm occurred during this evening (every evening before there had been an aggravation of them), but she was always very rigid in both body and limbs, and the opisthotonos and trismus were quite marked. She was more cheerful, however, and spoke more distinctly. Two squares of calabar paper were given every hour during the night. On the 16th, the body being quite rigid, with frequent and severe spasms, it was concluded to *increase* the dose of the remedy, so that one grain of the extract was given every hour for eight hours, without any effect being produced. After the ninth dose, however, the following symptoms were developed: Eyes widely opened, staring, and glassy; pupils contracted to pin-points; pulse rapid and intermittent; breathing jerky and fitful; mucous rattle in the throat. All spasms had disappeared, nor could they be induced; in fact, all the muscles except those of the back were completely relaxed. From this state she recovered by the use of stimulants, *belladonna*, and the extraction of the mucous from the throat, the respiratory movements being more freely performed and the pupils dilated. She continued in a comparatively easy state for ten days, when symptoms of tetanus again set in.

At this juncture she was placed on the use of Frazer's tincture, in which five minims are considered equal to three grains of the kernel; *five* drops were given every two hours for some days, with gradual improvement and final recovery.

Case 2 was that of a boy aged thirteen, with a bruised and torn finger, and, as a consequence, tetanus set in about three weeks after injury. Five drops of the tincture of the bean were given every two hours. Each dose had a perceptible effect in relaxing the rigid muscles and rendering him less susceptible to the induction of spasms on touching the limbs. In *three* days he was able to sit up in bed, and in seven more he was able to walk about the ward.*

Hydrocyanic acid.—In a case of traumatic tetanus following a scald and terminating in lock-jaw, this remedy was used with the most satisfactory results. Dr. Moore,† in relating this case, thus

* St. Louis Medical and Surgical Journal, vol. iv, No. iv, p. 359.

† British Journal of Homœopathy, vol. xxiv., p. 507.

speaks: "Aconite and belladonna were given for the first forty-eight hours without any effect whatever; the spasms, on the contrary, were more numerous and violent and the patient much more prostrate. I then gave one drop of prussic acid (Scheele's) in a teaspoonful of water every two hours, the first result being that on the following night the patient slept for some minutes and had fewer spasms, and these less severe. The acid was steadily continued in the same way for a week, when the patient was able to sleep soundly for some time, and the muscles of the trunk and extremities had lost much of their rigidity and hardness. The same dose was then given four times a day, and later twice a day, until the stiffness had wholly disappeared. The locking of the jaw was the last to yield. The patient continued to improve, and six weeks after the doctor's first visit he was dancing a polka on the pavement to show how well he was."

Fraser records a case of "trismus algidus," resulting from exposure to wet and cold, so severe that the jaws could only be separated by considerable force. He gave *ext. cann. ind.*, commencing with one-fourth grain, *q. h.*, increasing the dose to three grains, *q. h.* In seven days 115 grains were taken. He improved gradually, and made a good recovery.

Chloroform.—Mr. Skey, of St. Bartholomew's Hospital, reports a case in which chloroform reduced the pulse of 130, and the accompanying rapid breathing and spasmodic condition of the muscles, "to the standard of health, for a period of some eighteen hours, with the single interval of about half an hour, during which time the agent was suspended, when all the symptoms immediately returned." Dr. Dick, of Buenos Ayres, relates a case of tetanus following an incised wound, and terminating in opisthotonos, with profuse perspiration, the last contact of air exciting the paroxysms. Chloroform, ten drops every twenty minutes, administered through the vacancy left by a missing tooth, soon checked the paroxysms, but leaving tenseness and rigidity of the cervical and abdominal muscles. Chloroform was continued for several days, the second day the dose being increased to thirty drops every half hour. There was no paroxysm till the twelfth day of treatment. On the fourteenth day, for the first time since the beginning of the disease, the patient slept; bowels began to act naturally, symptoms gradually improving; and on the twenty-third day he asked for food. The

chloroform was given in 30-drop doses every two hours till midnight, and on the thirtieth day the muscular movements were free and almost natural.

During my term of service in Mound City Hospital, I treated two cases of tetanus following gunshot wounds, with complete success, by the inhalation of chloroform, after every known expedient had failed. The chloroform was given until all symptoms disappeared, and again administered with a return of the attack. This was kept up in one case for two days, with complete and permanent recovery. In the other case the chloroform was continued for *three* days, with *entire removal of all tetanic symptoms*, the patient sinking under the exhaustive effects of the suppuration and chloroform combined *four* days after all evidences of tetanus had passed away.

Dr. J. H. Payne* records an interesting case of chronic tetanus which had withstood the armamentaria of the old-school treatment, and was finally cured with *stramonium*, *belladonna*, and *sulphur*.

Warm baths are highly advocated by Drs. Marcy and Hunt in the treatment of this affection. They say: "We have seen the most unequivocal advantage follow general bathing and a thorough application of fomentations to the affected parts and to the spine. We can call to mind two cases where life was apparently saved by the persevering application of these hot fomentations together with frictions along the course of the spine." Other practitioners recommend the prolonged application of ice to the spine. So far as I have been enabled to discover, neither of these local expedients have had any decidedly favorable result.

After recovery begins to take place, the greatest care must be observed during convalescence lest a relapse occur and destroy the patient when he is apparently on the very threshold of returning health. The clothing should be warm; the diet light but nutritious; the secretions preserved in as normal a condition as possible, and all exposures to atmospheric vicissitudes sedulously avoided.

* American Homœopathic Review, vol. ii, p. 278.

CHAPTER II.

NEURALGIA.

In this disease, pain in the course of a nerve or greatly-increased superficial sensibility is the characteristic symptom. It is of all degrees of severity—sometimes moderate, at other times unendurable, even by those who possess the greatest fortitude. When severe, it usually comes on suddenly, with a kind of shock, and continues of a sharp, darting, or tearing character, coursing along the trunk or track of the affected nerve, the distribution of which may often be indicated by the direction the pain takes. It is often accompanied by other sensations, such as tickling, smarting, or creeping feeling on the affected surface; in some instances relieved by pressure, in others it is increased by the slightest touch or movement of the part. Occasionally there is a spasm in the muscles supplied by the affected nerve; in others, heat and redness of the surface, with increased secretion from the neighboring organs, as a flow of saliva or tears, when the nerves of the eye or jaw are implicated. The duration of an attack may vary from a few moments to many days or months, the pain most commonly being intermittent or remittent, often irregularly so, but in some instances the periodicity is well marked. The disease may affect almost any part of the body. It is most commonly seated distinctly in the trunk and branches of a nerve. The divisions of the fifth pair are especially liable to be affected; it may extend to the whole of the branches of this pair on one side of the head and face, or more commonly it is confined to one of its principal divisions, such as the infra-orbital, which is especially liable to be affected by it. In many instances it is seated in the temporal and dental. Not infrequently some of the terminal twigs merely of one of these nerves become the seat of intense pain; thus, occasionally the affection is found limited to a patch on the cheek, brow, or temple, from which it scarcely ever shifts. The posterior branches of the dorso-spinal nerves, and the intercostals, are also very commonly affected, though not to the same extent as

the fifth pair. In other cases the whole of an organ, or part, becomes the seat of neuralgia, though no one nerve may appear to be distinctly implicated; thus, the testes, the breast, the uterine organs, or one of the larger joints, as the hip or knee, is occasionally the seat of severe suffering of this kind. An extreme degree of cutaneous sensibility is a marked feature in the affection, in some cases the patient wincing and suffering severely whenever the skin is pinched or touched, however lightly.

The causes of this disease are various. In many instances they appear to be purely of a nervous character, depressing influences of all kinds being especially likely to produce it; thus, debilitating diseases, mental depression, and particularly exposure to malaria, are common exciting causes. Those forms of the disease arising from malarial influences, or from exposure to simple cold and wet, usually assume a very intermitting or periodical character, and are commonly seated in the nerves of the head. The hysterical character very frequently disposes to the spinal and articular forms of neuralgia. Various sources of peripheral irritation, as loaded bowels, the irritation of worms, and carious teeth, may be recognized as producing some of the more obscure forms of the disease.

Neuralgia may also arise from any compression exercised upon the trunk of a nerve, and thus indeed some of the more intractable forms of the affection have their origin. Thus, the pressure of a tumor of any kind, or of a piece of dead bone, may give rise to the most intense pain in the part supplied by the irritated nerve; and it is not improbable that in many cases of neuralgia in the branches of the fifth, pain may be owing to periosteal inflammation, or other disease of the osseous canals, through which these nerves pass.

Diagnosis.—The diagnosis of neuralgia, though usually effected without difficulty, is in some cases a little embarrassing, as the pain may occasionally simulate that of organic disease or inflammation of a part. From organic disease of a part that is the seat of suffering, such as the knee, the hip, the testis, or the breast, this disease may usually be distinguished by the coexistence of cutaneous sensibility, the existence of the hysterical temperament, and the absence of other signs that would accompany lesion of structure in the part affected. From inflammation the diagnosis is usually easy by attending to the intermittent character of the neuralgic pain, its

occurrence in hysterical temperaments, and in the absence of the constitutional symptoms of inflammation. But occasionally, when local inflammatory irritation is conjoined with neuralgia, the diagnosis is truly difficult. Here the presence of cutaneous sensibility, and the relief of the pain by firm pressure, will indicate neuralgia; whereas, in inflammation there is no tenderness of surface, but the suffering is aggravated by deep pressure.—*Erichsen*.

Treatment.—The treatment of this disease must have especial reference to its cause, and will be correspondingly successful as this is more or less removed. When the neuralgia proceeds from any central nervous affection, the ultimate occurrence of disease assuming a more or less serious type, as insanity, epilepsy, etc., may be suspected. Thus, neuralgias of the uterus from disorders of that organ require the removal of the disorder before the neuralgia can be successfully treated, and so with the stomach, intestines, etc., etc.

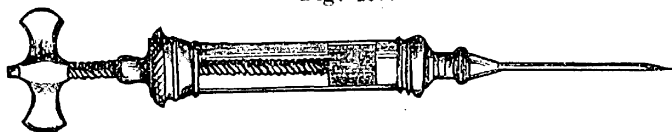
Operative procedure by dividing the implicated nerve has been recommended by high allopathic surgical authority, but it seems not to have answered the purposes indicated. I have frequently witnessed, after the division of the infra-orbital nerve, the pain shifting from the branch cut to seize with increased tenacity the submental. The nerves on which this operation has been most frequently performed, are the infra-orbital and submental. In case of a division of either of these nerves (which is by no means recommended except when all other means have failed), it is best not only to divide the nerve, but to excise a portion of it; otherwise reunion will speedily take place, and, the continuity of the nerve being re-established, the pain return, oftentimes in a form more aggravated than before. Excision, therefore, is now almost entirely limited to those cases in which an obviously-altered portion of the nerve affected can be safely and completely taken away. Dr. Carnochan, of New York, published, a few years since, an exceedingly interesting paper, in which he performed a novel operation for the cure of an aggravated attack of neuralgia of the face, implicating the second branch of the fifth pair of nerves. The operation consists in making a free incision on the face and perforating the anterior and posterior walls of the antrum, removing the ganglion of Meckel from its position in the sphenomaxillary fossa. At the same time he excised a portion of the superior maxillary nerve an inch and three-quarters or two inches in length, cutting across the trunk

of the nerve, immediately below the foramen rotundum. The examination of the portion of the nerve removed showed that the trunk was thickened, vascular, and enlarged, both the neurilemma and nerve proper being alike affected. The result of the operation was satisfactory in the highest degree, no unfavorable consequences followed, and the patient was completely relieved of this agonizing disease.

To effect division of the inferior dental branch, an incision should be made over the perpendicular ramus of the lower jaw, and the masseter muscle divided, in the direction of its fibers, down to the bone. The crown of a trephine should then be applied upon the bone at a point immediately below the entrance of the nerve into the dental canal. The trunk of the nerve to the extent of half an inch or more in length may thus be easily exposed and removed.

The *endermic* application of tincture *aconite*, *ammonia*, *chloroform*, *veratria*, and *morphia*, along the course of the nerve, has frequently been resorted to with much benefit in cases that seemed not to yield to internal treatment. I have often used, with the most excellent results, *subcutaneous injections* of *nux vom.*, *aconite*, *ignatia*, *cedron*, and *quinine*. In introducing these remedies with

Fig. 199.



the hypodermic syringe (Fig. 199), care must be taken that the strength and amount of the remedy used be not too great, as the poisonous effects that follow over-doses are often very injurious. I have generally employed the first dilution of the remedies mentioned, and graduating the quantity to be used by a screw on the top of the syringe, introduce the sharp-pointed nozzle under the skin and integumentary structures, and throw the liquid within the tissues, the operation being performed as near as possible to the seat of disease. The quantity to be thrown in depends almost entirely upon the temperament and idiosyncrasies of the patient. From five drops to one dram may be used, according to circumstances.

Before resorting to operative procedure, all the resources of our art should be exhausted. The principal specific remedies for the treatment of this painful affection are: *aconite*, *arnica*, *acid*

hydrocyanic, apis, agaricus musc., arsenicum, æsculus, belladonna, bryonia, baptisia, colocynth, china, calcarea carb., cannabis ind., codeine, cedron, chamomilla, gelseminum, hepar sulph., hyosciamus, iris versicolor, ignatia, mercurius, nux vomica, opium, phosphorus, pulsatilla, sepia, sulphur, spigelia, sticta, stramonium, tinct. valer. In acute forms of neuralgia, the lower potencies of the drug will be found generally more curative; while in the more chronic varieties, the higher dilutions have accomplished the most successful results.

A few only of the more prominent remedies, with their indications, will be appended herewith, as it is entirely without the pale of this work to mention the great variety of medicines recommended for the various forms and phases of this affection.

Aconite.—Inflammatory neuralgia of the fifth pair, with throbbing, stitching, continuous pain in the nerve and surrounding tissues, and alternate heat and chilliness; rheumatic cases, with intolerable burning, tingling pain occurring in paroxysms, with great nervousness; pain confined to one side of the face, engorged conjunctiva, sparkling and protruding eyes, with throbbing of the facial arteries, denoting determination of blood to the head; in neuralgias accompanied with great erethism of the vascular system, affecting either of the nobler organs of the system; in congestion or functional derangement of the head, heart, or chest; in *neuralgia of the stomach*, attended with burning, agonizing pain, as if of a red-hot iron lying within; *neuralgia of the face (prosopalgia)*, as characterized by boring, wrenching, burning, shooting, and lancinating pains; *neuralgia of the liver*, or *hepatalgia*, as indicated by hard, aching, burning, constricting, dragging pains; *neuralgia of the womb*, or *hysteralgia*, by gnawing, burning, hard, aching, or screwing pains; *neuralgia of the rectum (proctalgia)*, by dragging, oppressive, burning, and constricting pains; *neuralgia of the heart (cardialgia)*, with distressing pain in the region of the heart, depression, and tendency to irregularity of the pulse, especially in persons possessing a rheumatic or asthenic diathesis; *neuralgia in the jaws*, induced by a cold, with aching, burning, stinging pains, affecting the whole of the lower jaw. It is exceedingly serviceable as an *external* application, as well as an *internal* remedy, and should always be applied in the direction of the nerve implicated.

Arsenicum is more appropriate to the lymphatic, choleric, and nervous temperaments, with disposition to melancholy; general appearance of debility and exhaustion; countenance pale and sunken; lips bluish; twitchings of the muscles of the face, lips, and eyelids; tongue pale; coldness of the extremities; feeble pulse; paroxysms of excruciating pain in the head, particularly in the evening and at night; pains aggravated from the slightest movement or touch; scalp sensitive to touch; roaring in the ears during pain; mouth dry; thirst, or adipsia; unpleasant taste; aversion to food; nausea; eructations; burning or cramp-like pain in stomach; cramps in extremities. In neuralgia of the face caused either by carious teeth or exposure, attended with soreness of the nose, œdema of the face, and with gastric irritation, and especially when there is an uncontrollable restlessness in the affected part; pains that occur at night in *regular* paroxysms in the extremities, as well as in the back; hard, aching, bruised pains in the bones, especially when attended with excessive nervousness and restlessness.

Belladonna is adapted to persons of a sanguine and choleric temperament, full and plethoric habits, cheeks red and swollen, eyes spasmodically closed, spasms and startings in different parts of the body, trembling and rigidity of the extremities. In a case of neuralgia of the infra-orbital nerve, where a number of remedies had been given in vain, the affection was cured promptly and permanently by applying the *ext. of belladonna* under the eye. The action of belladonna upon the nerves of the face is characterized by swelling and inflammation of one side or of the whole face; burning, weeping, cutting, tearing, drawing, lancinating, and stinging pains, aggravated by every movement, all kinds of noise, bright light, the least commotion, and even by the walking of persons in the room above; daily paroxysms of pain from the afternoon until past midnight; aggravation from a current of air, from the warmth of the bed. Several cases are recorded of cures by this remedy, in which the neuralgia was seated in branches of the fifth and seventh pair of nerves, being confined in all cases to one side.

Nux vomica is adapted to sanguine or choleric temperaments, lively dispositions; red face, in persons addicted to spirituous liquors or to coffee; also in those who lead a sedentary and secluded life; drawing or jerking pains, which appear or are aggravated in bed, in the morning, or after a meal, also in free cold air. *Nux* is gen-

crally useful when the pains are tingling, hard-aching, and sticking, especially when aggravated or excited by motion or contact. An exceedingly-interesting case is published in Braithwaite's *Retrospect*, showing the cure of tic douloureux by grain-doses of *nux*. The patient had been taking morphine for the relief of his sufferings, with only temporary benefit. By mistake he one day took three and one-half grains of a powder containing strychnine; in a little while he felt a disagreeable numbness in his legs; in a short time violent tetanic spasms set in, affecting the legs and respiratory muscles almost to suffocation—the person retaining consciousness, although his senses seemed to be invested with unwonted sensibility. After a while the paroxysms yielded, and the man never afterward had another attack of tic douloureux.

China, or *cinchona*, is curative when there is excessive irritability of the skin; aggravation of pain from the slightest contact; sensation of torpor and paralytic weakness in the part affected; oppressive pain; paleness of the face, with transient heat and redness of the countenance; great loquacity or nocturnal agitation; pains characterized by stitching and drawing in the head and extremities, especially when made worse by contact, and accompanied by slight vascular erethism, excessive restlessness, nervousness, and wakefulness. The true sphere of china has especial reference to periodicity—the attacks recurring at certain hours each day or alternate day, and probably always partaking of a miasmatic origin—in certain forms of congestive malarial fever, in which neuralgia of the face or temples is the most distressing symptom. The inmost character of those neuralgic affections in which malaria plays an important role will be successfully treated by *china*, *quinine*, *arsenic*, or *cedron*.

Gelseminum has been successfully employed by myself and others in the treatment of facial neuralgias which other remedies had failed to relieve. "It is especially indicated," says Noe, "in those neuralgias which arise from functional disturbance of the nervous system." Prof. Ludlam says: "In some cases of orbital neuralgia characterized by distinct nervous paroxysms of acute pain, of a quotidian type, located along the superciliary ridge, especially over the left eye, with contractions of the eyelids and a peculiar expression in the eye of the affected side, we have given the gelseminum with good effect. In one case where quinine had failed,

gelseminum afforded prompt relief. In most cases the relief of suffering has been gradual, the pain tapering off quietly and imperceptibly." In neuralgia of the intestines, the tincture in drop-doses, given every fifteen minutes, has proved a successful remedy.

Dioscorea villosa has been recommended very highly in facial neuralgia, in hyperæsthesia of the brain, spine, uterus, and other portions of the nervous system. Its power over painful nervous affections is said to be marked and curative in almost all cases. In painful affections of the nerves of the abdomen, it is said to have succeeded where *nux*, *colocynth*, *chamomilla*, and *carbo veg.*, had entirely failed.

Colocynth.—"The curative sphere of this remedy," says Watzke, "is confined to a few neuralgias and hyperæsthesiæ, and of these almost exclusively those which affect the *trigemini*, the *cæliac plexus*, the *femoral* and *lumbar* nerves." The prosopalgia, which colocynth cures, proceeds from an exaltation of sensibility, dependent upon rheumatic, gouty, or gastric irritation, or in those cases which depend on a purely functional affection of the sensitive filaments. In *organic* neuralgias depending upon physical causes, it is of little benefit. It is adapted to dry, bilious, choleric, and melancholy temperaments, and is especially suitable in cases of neuralgia occupying the *left* side of the body, the paroxysms being attended with spasms, twitchings, and contractive sensations, the lancinations being sudden, violent, and extending a distance from the starting-point.

Iris versicolor, in prosopalgia of the left side, in a female, with severe and agonizing pains in the direction of the nerves.

Rhododendron cured three cases of prosopalgia in females who were not relieved by the ordinary remedies.

Ignatia—In those temperaments wherein sadness or taciturnity exists, or mildness and sensitiveness, with tendency to be frightened; tearing pains, or pressure from without inward, or lancinating, boring, accompanied with paleness of the face, and in which a momentary mitigation is experienced from a change of position; the pain is felt very acutely on touching the part, is immediately renewed after dinner, in the evening after lying down, and in the morning immediately after waking. The symptoms of *ignatia* are increased by taking coffee, by the use of brandy, by smoking tobacco, or even by noise.

Chelidonium majus is recommended as "a most useful remedy for removing neuralgic pains of the eyebrow and temple, especially of the right side, and is applicable to all ages, sexes, and temperaments. The characters of the pain must be generally pulsative and burning, or less frequently lacerating and tearing. The attacks are periodic, generally preceded by shivering and yawning. The pain always begins in the temple or eyebrow, extending, as it becomes more intense, to the forehead, orbit, and eyes; the eye becomes injected and sensitive to light; pressure relieves the pain, while movements aggravate it."

Cedron is appropriate for neuralgia occurring in periodical paroxysms. Says Dr. Casenave, it is a drug which should be administered as a *unit* or single dose, either as a curative or prophylactic force, and not to be repeated except at long intervals. A single dose of the selected potency will always be sufficient to produce the desired effect; whereas if several doses be given, at frequent intervals, aggravation is almost certain to follow. A single dose of one grain of the third decimal has often cured a severe attack of prosopalgia when all other remedies had failed. When neuralgia has arisen from excessive loss of the fluids of the body, recourse may be had to *china*, *phosph.*, *calc. c.*, and *sepia*. When it is associated with scrofula, abuse of mercury, constitutional syphilis, or exostoses, *sulphur*, *silicea*, *hepar sulph.*, *nit. ac.*, *kali jod.*, *aurum m.*, and *sepia*.

When the heart is attacked, *acon.*, *cim. rac.*, *spigelia*, *veratrum*.

When it arises from a disordered uterine system, *cannabis*, *cauloph.*, *cim. rac.*, *puls.*, *sabina*.

In neuralgia from callous cicatures, *graph.*, *agaric*, *argent nit.*, *mercur.*, *china*, *ignatia*, and *sulphur*.

In neuralgia of the crural nerve, *coloc.*, *rhus*, and *cuprum*.

In neuralgia following suppressed gonorrhœa, *copaiv.*, *cannab*.

When it attacks the spleen, *china*, *sulph.*, *ranunc.*, *squilla*.

In prosopalgia, with agonizing pains in the course of the nerves, *iris versicolor* has effected prompt and permanent cures.

Electro-magnetism has also been much employed in various regions of the body affected with neuralgia, and often with considerable benefit. In applying this agent, the positive pole should be placed upon that portion in which the pain is experienced, and the

negative as near as possible to the root of the nerve supplying the part diseased. When the attack is of a rheumatico-neuralgic type, the remedies curative of the former condition will require to be alternated with the selected neuralgic remedy.

CHAPTER III.

NEUROMA.

Neuroma, or, as it is sometimes termed, *painful subcutaneous tubercle*, is a tumor connected with a nerve, and which is exceedingly painful. This class of tumors are fibro-plastic in character, being composed of white or grayish matter, and containing a yellowish or brownish fluid resulting from a disintegration of the central portion of the abnormal growth. They are usually solid to

Fig. 200.



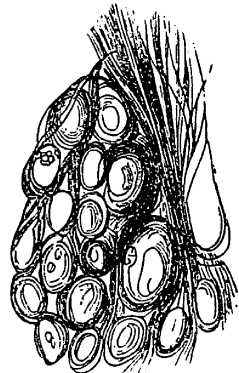
the touch; are rounded or oval in shape; more or less movable transversely, but not in the line of the nerve upon which they are seated. They vary greatly in bulk, being found from the size of a pin's head to masses a foot or more in diameter, and often result from wounds, or partial division of nerves. They are usually slow in their development, presenting no appearance of malignancy, and are generally found affecting the nerves of the spinal system; Fig. 200. They are commonly single, though occasionally have been met with in great numbers, when their sensibility is very much decreased. Mr. R. W. Smith mentions a case, coming under his own observation, in which there were probably not less than 2,000 of these tumors found upon the same individual. They are more frequently found upon the limbs than elsewhere, and more commonly on the lower than the upper extremities.

Treatment.—The treatment of this variety of tumor, whether idiopathic or traumatic, consists in extirpation. There are no internal remedies, so far as known, that have any decided curative action

over these morbid growths; and we are compelled, in lieu of medical treatment, to resort to a surgical operation for relief. The principal nerve with which the growth is connected is often necessarily divided, in which case paralysis results, which condition of the nerve may or may not be permanent. In cases involving very important nerves, as the sciatic, median, radial, or ulnar, an effort should be made to excise the diseased mass without dividing the nerve. Amputation has sometimes been resorted to for the cure of this affection, but it is difficult to conceive of a case where it would really be advisable.

The painful subcutaneous tubercle, as its name implies, is situated just beneath the skin, in the areolar tissue, connected with one or more very delicate nervous filaments, slightly enlarged and surrounded by cellulo-fibrous, fibrous, or fibro-cartilaginous matter, freely interspersed with corpuscles, as seen in the adjoining cut, Fig. 201. On being cut out it resembles most a small mass of adipose substance, the vessels being so small and so few as to be scarcely discernible.

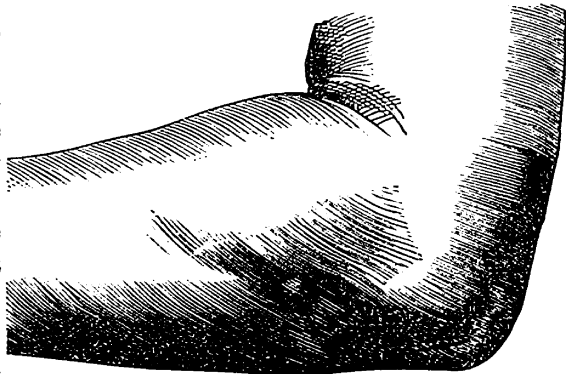
Fig. 201.



Microscopic structure of the subcutaneous tubercle.

Fig. 202.

The tumor is always remarkably small, seldom exceeding the size of a pea, is very movable, exquisitely tender to the touch, and the seat of frequent pain, often of a neuralgic character, and subject to constant



Painful subcutaneous tubercle.

exacerbations from the most trifling causes. It is said to occur most frequently in the lower extremities, but is often met with in the arm, forearm, and shoulder, as is seen in the accompanying sketch, Fig. 202. The painful tubercle is generally single, or, if multiple, it

is seldom that more than two or three are seen in the same person. It occurs in both sexes, but much more frequently in women than in men—the reverse being the case in regard to the neuromatous tumor. Its development is usually tardy, and several years often elapse before it becomes very tender and painful. During its development it always involves the skin, and is more prone to occur in women of a nervous, hysterical temperament. It is easily diagnosed by its situation just beneath the skin, the absence of discoloration of the surface, the peculiar character of the pain, and the intolerance of manipulation. Free excision, including a small portion of the surrounding healthy integument, is the only certain means of cure. When once removed, it never returns at the cicatrix. *Ac.*, *con.*, *ars.*, *merc.*, *nux*, *kali jod.*, *calc.*, *phos.*, *bell.*, *sulph.*, are among the most valuable remedies in the treatment of this disease. It is at times exceedingly stubborn and intractable, and requires alike the utmost patience of the practitioner and patient. The remedy selected, to be productive of decided benefit, should be administered in the higher potencies.

PART IX.

DISEASES OF THE BONES.

CHAPTER I.

CLASSIFICATION OF BONE DISEASES.

THE phenomena manifested by the various diseases of the bones correspond in their general course with the symptoms and terminations observed in affections of the soft tissues. Thus, the inflammation developed may be acute or chronic in its character, terminating in resolution or otherwise passing on to suppuration, ulceration, and even complete death of the part. For convenience of study, the diseases of the bones will be considered under the following heads, exhibiting :

1. A modification of their normal nutritive action.
2. The results of inflammation.
3. Structural changes, occasioned by a disproportion of the proper constituents.
4. Bony growths or tumors.

SECTION I.

MODIFIED NUTRITION.

§ 1.—Hypertrophy of Bone, or Hyperostosis.

Hypertrophy of bone consists in an increase of volume, similar to what occurs in the soft structures, the changes usually being due to inflammatory action. This condition, however, often appears gradually, without pain or other characteristic signs of inflammation.

This disease not only manifests itself in an enlargement of the circumference, but in rare cases the length of the bone is increased

Fig. 203.



Hypertrophy involving both thickness and length of the bone.

by deposits in its extremities; the bone also becomes dense, the spongy structure being wholly obliterated, while its weight is greatly augmented; Fig. 203. This sketch is from the drawing of a specimen in the museum of Professor Buchanan, of Nashville, Tenn. The osseous tissue, however, generally retains a proper quantity of animal matter; and hence, notwithstanding its rock-like solidity and apparent brittleness, is capable of resisting great force.

"The bones," says Mr. Cooper, "fall more slowly into disease than the softer parts, and their restoration is proportionately more tardy; and hence it is that disease or injury to the periosteum immediately affects the bone itself, a circumstance that must ever be borne in mind by the surgeon when operating upon bones, for it is scarcely possible that any very extensive destruction of periosteum can occur without exfoliation of the bone itself."

To effect a cure of these diseases, the causes upon which such affections depend must be removed. An absence of this knowledge too often results in those severer methods of treatment that rather aggravate these diseases than afford a beneficial effect. Whether the inflammation be acute or chronic, due attention should be given to the dietetic and hygienic condition of the patient. In the administration of the properly selected remedy, especially if the disease is chronic, experience has taught me that the higher potencies are followed by the most beneficial results; and this is true generally of all chronic diseases. The circumstances which should guide us in the choice of a remedy are, the temperament, the disposition, the character of antecedent diseases and the treatment to which they have been subjected, and the nature of the exciting cause producing

the disease. The principal remedies upon which reliance can be placed in the treatment of this affection are, *acid nitric*, *calcareæ carb.*, *calc. phosph.*, *assafoetida*, *aurum*, *causticum*, *kali iodatus*, *silicea*, *lycopodium*, *mezezeum*, *acid phosph.*, *baryta*, *mercurius*, *sulphur*.

The indications for these remedies, as well as all medicines appropriate to disorders of the bony structure, will be given at the conclusion of Diseases of Bones, to which the student is referred for more specific directions.

§ 2.—Atrophy.

Atrophy of a part or the whole of a bone consists in the partial absorption of its elementary constituents, and may occur in consequence of continued pressure, deficient nervous influence, insufficient supply of blood, or protracted disease of the part.

The influence of long-continued *pressure* in producing this condition is exhibited in the sternum and dorsal vertebræ from aneurism of the aorta; in the ribs in cancer of the mamma; and in the bones of the skull in tumors of the dura mater.

Deficient nervous influence, producing more or less complete paralysis, is a very frequent and powerful cause of atrophy in the osseous structures, as well as in the soft parts of the body. In paralysis of the lower extremities, especially, the whole limb gradually undergoes absorption, the bones becoming light, porous, and brittle.

Insufficient supply of arterial blood, occasioned by rupture of the nutrient artery, in the case of fracture, or its obliteration by pressure of the callus, is occasionally the cause of the wasting of the osseous tissue. In this case, however, the atrophy is generally limited to a part of the bone.

Protracted disuse of a part, as in the case of old luxations, is often quite sufficient to induce a wasting of bone.

To these causes may be added the influence of local injury, as a blow, wound, or contusion—the consequent disease of the bone, however, rarely extending beyond the immediate seat of the injury sustained by the soft parts.

In **Senile Atrophy** the bones become exceedingly brittle, with a corresponding loss of strength. The animal matter becomes par-

tially absorbed; the cancellous structure is rarified, and many of the vessels wholly obliterated. These changes are more frequently present in the neck of the femur than elsewhere, rendering aged persons particularly liable to fracture of this part of the bone from the slightest causes. This condition does not admit of cure. The most that can be done is to promote the general health, and remove any local causes of disease when they are found to exist. The chief remedies in this affection are, *calc. carb.*, *calc. phosph.*, *silicea*, *hepar sulph.*, and *sulphur*. The indications for the different remedies in the treatment of diseases of the bones will be more fully pointed out under the head of Ostitis.

‡ 3.—Tubercle of Bone.*

The deposit of tuberculous matter in bone plays an important part in many diseases of this tissue in children and young people of a scrofulous habit of body, being a common cause of some of the most intractable forms of ostitis, circumscribed abscess, caries, and necrosis. As tubercle is almost invariably deposited in the cancellated structure, it is a frequent cause of those forms of inflammation in the surrounding osseous tissue, which rapidly runs into a carious condition, with the formation of curdy pus, in which masses of half-disintegrated tubercle may be seen. If this destructive action takes place with great rapidity, portions of the bone will be found to necrose in small masses, which lie at the bottom of these tuberculous and carious cavities, as may commonly be observed in some forms of strumous caries of the os calcis and head of the tibia. When the tuberculous deposit has been very extensive, and is of a more acute character, it may cause inflammation and disintegration of the whole of the articular end of a long bone, with separation of the epiphysis. These destructive changes may take place with great rapidity.

When, on the contrary, the tuberculous matter is deposited in small quantity in an otherwise healthy bone, it may, as it undergoes softening, dispose to the occurrence of circumscribed abscess, at the same time that chronic thickening and condensation of the surrounding bone takes place. It is in consequence of this condensation

* Exclusive of treatment, portions of this chapter and the one preceding are from Erichsen.

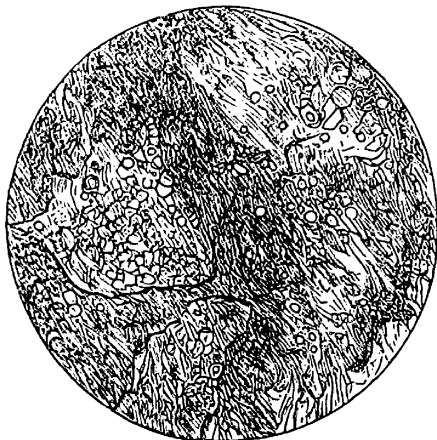
of the peripheral portion of the bone by the deposit of fresh layers of osseous tissues under the inflamed periosteum, and the difficulty that the tuberculous abscess necessarily experiences in traversing these hypertrophied osseous structures, that it is so apt, when deposited in the vicinity of a joint, to work its way through the cartilages into the cavity of the articulation ; as on this surface no fresh deposit or condensation of osseous tissue can take place, and consequently no additional obstacle be offered to the onward progress of the tubercle, or rather of the curdy pus into which it has become transformed.

The presence of tubercle in osseous tissue thus not only gives rise to destructive changes in the bone and adjacent articulations, but will occasion inflammation and extensive suppuration in the neighboring soft parts. Some of the largest chronic abscesses that form in the body, those connected with diseased dorsal or lumbar vertebræ, owe their origin, in the majority of cases, to the deposit and disintegration of tubercle in the bones. When once tubercle in bone has given rise to caries and perforation of the osseous tissue covering it, together with plastic infiltration, and abscess and sinuses of the soft parts, these conditions will continue in a permanent manner, the fistulous tracks leading down to the bone and the cavities in it remaining open as long as any tuberculous matter is left at the bottom of them ; and in this way the patient may eventually be exhausted by the copious and continuous discharge from these osseous vomicæ. In some favorable cases, as the result of natural processes, and in others by those operations that the surgeon practices for caries, the whole of the tuberculous matter may be disintegrated, and thus eventually eliminated — a true vomica being left in the bone, or scooped out by the gouge ; and then the fistulous track, whether in the soft structures or in the bone, having no longer this kind of foreign body lying at its bottom, will gradually close, not by the contraction of its osseous walls, which is, of course, impossible, but by the deposition of a fibrous tissue by which the cavity is occluded.

Pathology.—Kelaton has given special attention to the pathology of bone, and to the important part that it plays in the diseases of the osseous structure. He describes two forms of tubercle in this situation ; the first is the encysted variety, which occurs in the form of small masses, of an opaque white or yellowish color, con-

tained in the cyst, which is soft, vascular, and spongy, apparently of a cellular structure. This variety is stated by Kelaton to be the most common. The other form in which tubercle occurs, according to Kelaton, is an infiltration into the cancellous structure of bones.

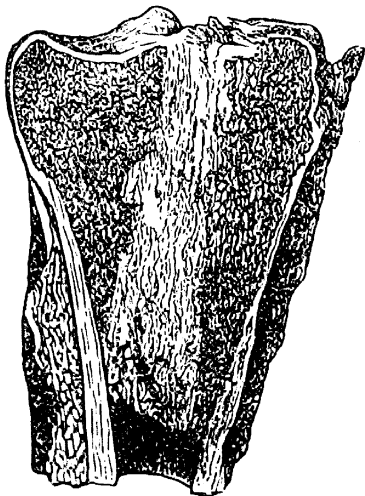
Fig. 204.



This may be in the form of semi-transparent granulations of a grayish or rosy tint; opalescent and slightly transparent. Occasionally these granulations are firm, so as almost to resemble cartilaginous deposits in the interior of the bone. The osseous structure, in the midst of which this kind of tuberculous matter is deposited, does not appear to undergo any material alteration. The other form of

tubercle is that in which is infiltrated an opaque puriform matter of a pale yellow color, soft, and without vascularity. (Figs. 204

Fig. 205.



and 205). The osseous tissue, under the influence of this disease, often becomes, as Kelaton observes, more condensed than natural, the cells being obliterated so as to resemble the compact substance of bone. In some cases it may continue thus chronically thickened, and indurated, but in other instances the tuberculous inflammation will give rise to rapid and destructive inflammation of the surrounding osseous tissue, which becomes excessively vascular, and crumbles down into a carious state with some necrosed

masses intermixed. In other instances, again, it is not unfrequently observed in some of the forms of caries of the spine, or

of white swelling; slow suppuration takes place in the interior of the bone; and on the sides or in the center of the abscesses thus formed, hardened and white ivory-looking masses and knobs of osseous tissue may be seen to be deposited, these apparently consisting of the tuberculous bone that has undergone some special modification of structure.

Treatment.—The medicines that are productive of the most benefit in this disease are, *arnica*, *assafœtida*, *aurum*, *acid nitric*, *angustura*, *calcareæ c.*, *calcareæ phosph.*, *kali iodatus*, *lycopodium*, *mezereum*, *phosphorus*, *silicea*, and *sulphur*.

Assafœtida is useful in diseases of the bones dependent upon a scrofulous taint or a complication of syphilis and mercury, the bones being quite sensitive to the touch; also in exostosis, especially where occurring in the extremities.

Aurum has been found exceedingly beneficial in affections of the bones, particularly if induced by mercury, or from a complication of mercury and syphilis. In diseases of the bones of the nose, forehead, and cheeks, it has proved highly efficacious. In *ozæna*, it has been found very successful.

Arnica.—In a case of exostosis of the femur, produced by injury of the thigh, by a blow, this remedy gave immediate relief to the pain and reduced the swelling.

Acid. nitric.—In caries of the ossa nasi in children born of scrofulous or syphilitic parents; in caries of the bones of the extremities, accompanied with great pain.

Acid. fluoricum has frequently been employed with excellent results in diseases of the bones generally.

Angustura has been recommended for diseases of the bones in patients who have indulged to excess in coffee, or who have a morbid desire for it.

Calcareæ seems to have a more beneficial influence over the constitutional depravity than over the local morbid action going on in the bones. It is especially adapted to children of a scrofulous habit, who, though they appear tolerably healthy, are inclined to weakness, uneasiness of the whole body, with bloated, distended abdomen. Its action is more advantageous when used in alternation with the remedy specific to the disease, and with *silicea* is one of the most efficacious remedies for affections of the bones.

Kali iodatus is employed in diseases of the extremities of bones,

accompanied with aching and tearing pains, especially at night; in stiffness and tension of the limb, with throbbing and beating in the part; when the patient takes cold upon the least exposure.

Lycopodium is curative in hypertrophy of bones, with periostitis; with nightly pains of a drawing, tearing, and twisting character; it is useful, also, in diseases of the bones from scrofula, mercury, and syphilis.

Mercurius has proved invaluable in diseases of the bones complicated with syphilis, the pains being of a boring, gnawing character, becoming intolerable at night; redness and swelling of the soft tissues covering the bones; stitching, cramp-like pains in the periosteum, with boring pains along the tibia, and aching in the bones, especially in constitutions impaired or enfeebled by scanty or innutritious diet; among those living in damp, dark, or badly-ventilated apartments; or in persons of a lymphatic temperament, having nightly exacerbations of pain. In exostosis of the tarsal bones it is very serviceable.

Mezereum is valuable in scrofulous patients when the pains increase at night, are of a violent, burning character, and made worse by pressure; the pains are so violent that it is hardly possible to place the foot on the floor; the periosteum feels as if it was being torn off; chilly sensations pass quickly through the body, with continual violent thirst.

Phosphorus has caused necrosis of bones in those persons who have been much exposed to its vapor. It has cured exostosis on the frontal, parietal, and occipital bone; also on the clavicle when the pains were intense, aggravated by the slightest touch, of a tearing, burning character, with nocturnal exacerbations. It is also a valuable agent in diseases of the bones in persons with low vitality.

Silicea is one of the most valuable remedies we possess in the treatment of all diseases of the bones. It exerts a specific influence over the inflammatory action going on within the bony structure, as well before as after the breaking up of the structures by the ulcerative process. It controls as well the accompanying nervous irritation in those diseases so often preventing sleep.

Sulphur is useful in diseases of the bones occurring in scrofulous persons, or in those of a lymphatic or bilious temperament. It has been frequently employed with much success, before *calcareo*, on beginning the treatment.

Local remedies are of little value in the treatment of this disease, and the use of counter-irritation, bleeding, leeching, etc., etc., of the old school, has effected little or no beneficial results so far as cure is concerned. When the disease terminates in an abscess, as will be known by fever, swelling, intense pain, etc., the surgeon should cut down and expose the bone at or near the seat of the pain, perforate the bony tissue as far as the medullary canal, by means of a trephine, so as to give vent to the pus. The case will be treated afterward as recommended under the head of Suppuration and Abscess of the Soft Structures.

SECTION II.

RESULTS OF INFLAMMATION.

§ 1. — Periostitis.

Inflammation of the Periosteum is a common occurrence, as the result of injuries, as a consequence of syphilis and rheumatism, or as a natural process dependent on disease of the subjacent bone. It often affects the membrane covering the shaft of a bone, and very commonly attacks the articular end, becoming associated with inflammation of the contiguous joint. When acute, the membrane becomes thickened, soft, and vascular, and loosens from the subjacent bone. When chronically inflamed, the periosteum becomes thickened by the deposits of plastic matter within and beneath it, and the subjacent bone usually participates in the changes, undergoing hypertrophy and induration. In some cases, but rarely, suppuration and death of the layer of bone immediately subjacent to the affected membrane takes place. Periostitis, like all other inflammations, may terminate by resolution or by the production of lymph and hypertrophy; in pus, ulceration, mortification, or sloughing. When examined at different periods, an inflamed periosteum will be found to offer all the usual appearances consequent on inflammatory action elsewhere, such as increased vascularity or redness, and exquisite sensibility; while subsequently are seen such results of inflammation as create and organize lymph, or tend to the formation of pus, with ulceration and other degenerations of tissue.

Symptoms.—The existence of *acute* periostitis is first known by pain in the course of the bone, which is generally increased on

pressure. In its early stages, it is oftentimes difficult to distinguish between it and inflammation of the bone itself. After pain is fully developed, the part soon becomes hot and swollen, the tumor being circumscribed, firm, and resisting, seldom attaining any size, but softening slowly and suppurating, though presenting little evidence of fluctuation. As suppuration increases, the pain becomes more severe, owing to the effusions being circumscribed and stretching the inflamed and closely-adherent membrane. At this time, fever occurs, accompanied with great restlessness, insomnia, and other evidences of constitutional irritation. In *chronic periostitis*, the progress of the disorder is less rapid, the tendency of the inflammation being rather to the production and organization of fibrin than to suppuration. Consequently, chronic periostitis more frequently results in thickening of the membrane and hypertrophy of the bone than in abscess.

Prognosis.—The result of periostitis, if promptly and properly treated, is usually favorable; but if neglected, it is very apt to be followed by such diseased action in the bony tissue as may result in *ostitis*, *caries*, or *necrosis*.

Treatment.—The indications for treatment in periostitis are the same as those required in other inflammations of fibrous tissues, the means being varied in order to meet the peculiar action of the cause which produces it. In the *acute* variety, the *local* measures recommended under the head of Inflammation will be found of great efficacy. When there is reason to think that pus has formed beneath the periosteum, this membrane should be incised by cutting down freely to the bone, so as to give free vent to the matter and prevent its accumulation from elevating the membrane from the bone, and thus impairing its vitality. So prompt is the relief given by this means, that Malgaigne, Velpeau, and others, have recommended free incision in all cases of acute periostitis at an early period, or before there is any evidence of suppuration. Some authors have advised the division of the periosteum subcutaneously, in order to guard against an alleged tendency of the bone to become carious when fully exposed; but later authorities are of the opinion that this operation does not sufficiently relieve the tension in the part, and hence propose the free incision of the membrane.

After the evacuation of matter formed beneath the periosteum,

the wound should be treated on the general principles already given in the treatment of abscesses.

In *chronic* periostitis, there is a marked tendency to the production of lymph, which, becoming organized, soon results in a permanent thickening of the part, designated as *node*. This, if not properly treated, may result in hypertrophy of the bone, and thus serve as one of the exciting causes of certain bony tumors, as exostosis, or osteophytes. In the early stages of chronic periostitis, the tincture of *iodine* painted freely over the part is often productive of excellent results. But as the chief source of trouble is the formation of lymph, internal remedies are always demanded to obviate the tendency to such production and to cause an absorption of the fibrin already thrown out. The remedies of most service in the treatment of this affection, are: *aconite*, *aurum*, *calcareæ carb.*, *kali jodatus*, *mezereum*, *mangan. acet.*, *mercurius*, *phytolacca dec.*, *ruta graveolens*, *rhododendron*, *staphisagria*, *silicea*, and *sulphur*.

Aconite is indicated when the inflammation is of an acute character, or when occasioned by exposure to cold or dampness. It is said to have restored the parts to a healthy action even when exudation had taken place between the periosteum and bone.*

Aurum is serviceable when the periostitis has arisen from or is complicated with a mercurio-syphilitic dyscrasia; when pains increase at night with great severity, and also after the formation of nodes. It also exercises a marked effect in inflammations of the membrane covering the bones of the nose and palate, and seems to be in special *rappor*t with diseases of the nasal and palate bones.

Calcareæ carb. is useful in periostitis occurring in a scrofulous habit, especially in children with bloated and distended abdomen, and general impairment of the vegetative process.

Mezereum, in periostitis of the tibia, accompanied with violent, burning pains, caused by the slightest pressure; also in rheumatic inflammation of the periosteum covering the iliac bones, occurring in mercurio-syphilitic habits.

“*Mangan. acet.* is less useful,” says Hartmann, “in inflammation of the bone itself than in periostitis and inflammation of the joints, with intolerable pains.”

Ruta graveolens, in peritonitis following injury of the membrane, or as the result of external violence, is one of the most valuable remedies, both externally and internally applied.

Mercurius exercises a profound impression in periostitis and nodes, as well as in diseases of the bones, but should never be used when the patient has been previously subjected to the action of the drug in massive doses; in periostitis characterized by boring and gnawing pains that recur nightly and become almost intolerable.

Phytolacca dec. is highly recommended in rheumatic affections of the fibrous tissues covering the bones, especially when there is the presence of syphilitic taint. In a very severe case of periostitis of the right femur, produced by exposure to cold and wet, phytolacca cured the patient after the failure of a variety of remedies.*

Rhododendron, in periostitis, with tearing and stinging pain in the right tibia; also in rheumatic inflammation of the periosteum of the right arm, the suffering appearing to be most severe when the limb is at rest, and to be increased at the approach of bad weather.

Staphisagria, in periostitis characterized by tearing pains in the calves and knee-joints; torpid swellings of the bones of the leg and foot, especially when the pains are accompanied by chilliness rather than heat, or when such pains can be traced to, or are accompanied by, mercurial taint.

Silicea, though more powerfully curative of diseases in the bones themselves than in their coverings, becomes an exceedingly useful agent in periostitis, when from neglect or improper treatment the inflammatory process has attacked the osseous structure, and more particularly when there is complicated with the periostitis a mercurial taint.

Sulphur.—In all cases of periostitis when there is present a scrofulous element, an occasional dose of this remedy as an intercurrent medicine has a most excellent effect; it corresponds to the boring, tensive pains in the joints and muscles, as well as those occupying the continuity of bones.

Oleum jecoris (cod-liver oil) has been much used by a few practitioners of our school, with most excellent results, in persons

* Hale's New Remedies—article, *Phytolacca Dec.*

whose constitutions partake of a scrofulous taint; or in those whose systems have been debilitated by long-continued sickness.

Most of these remedies may also be employed with advantage in the ossific disorganizations that sometimes follow a chronic and even an acute attack of periostitis.

§ 2.—Ostitis.

Inflammation of bone may arise from the same constitutional causes as the preceding disease, but most commonly occurs as the result of injury, either accidental or inflicted by the surgeon in an operation. When a portion of bone is inflamed, the periosteum and medullary membrane participate in the morbid action, and, together with the affected osseous structure, become highly vascular. At the same time the inflamed bone becomes expanded and softened, partly in consequence of changes induced in its organic constituents, and partly in consequence of the cancellated structure becoming more cellular from interstitial absorption; the cells becoming filled with a sero-sanguineous fluid. The compact structure of inflamed bone undergoes a peculiar kind of laminated expansion, so that a section of it presents the appearance of concentric parallel layers. When the inflammation is chronic, the bone is likewise expanded; but instead of becoming looser in its texture and softened, as in the acute form of the disease, it becomes very dense, indurated, and compact; looking and cutting more like ivory than ordinary bone. Sometimes considerable elongation, without much or any thickening, will take place. I have seen as the result of ostitis, the tibia one and a half or two inches longer than its fellow.

The *symptoms* of ostitis consist of enlargement of the bone, with deep-seated pain and great tenderness in the limb; the pain, as in periostitis, is greatly increased at night, and, when the disease is chronic, is very much influenced by the state of the weather.

Ostitis is principally of importance to the surgeon from its connection with other more serious diseases of bones, in which it not unfrequently terminates. These conditions are suppuration of the bone, its ulceration, caries, and necrosis.

Treatment.—The treatment of this affection is the same, under all ordinary circumstances, as inflammation of the soft tissues.

The results of osteitis will be treated of under their appropriate headings, such as Suppuration, Ulceration, etc., etc., to which the student is referred for direction.

§ 3.—Suppuration in Bone.

This disease, like that which takes place in the soft tissues, varies much in extent, being either circumscribed or diffused, and is one of the most common results of osteitis. Like other diseases, it possesses two distinct characteristics—the *acute* and *chronic*.

The *acute* form constitutes the osteo-pyelitis of authors, and is met with after amputations. The medullary canal is the portion first

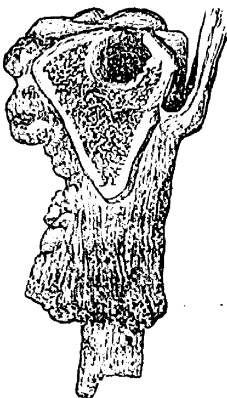
attacked, and subsequently the compact osseous structure becomes involved in the increased vascularity

Fig. 206.



and inflammation. Mr. Stanly observes that the medullary membrane in this disease becomes vascular, and, like the conjunctiva in chymosis, is often gangrenous. In a case in which Mr. Erichsen excised the elbow-joint, the patient died of pyemia; and after death the interior of the humerus was found to be inflamed and filled with pus, and the axillary vein in a state of suppuration, Fig. 206.

Fig. 207.



Abscess in the head of the tibia.

Chronic suppuration is of the circumscribed form, and is the result of inflammation terminating in abscess. These abscesses are usually met with in the cancellated structure, and occur with special frequency in the articular extremities of the long bones. Sometimes they are developed with considerable rapidity, while at others they progress slowly. The acute form is probably the result of tubercle previously deposited in the bone, which, forming in the cancellous structure, is exceedingly prone to produce disintegration of the contiguous cartilage of incrustation, and eventually to burst into the neighboring joint, as is shown in Fig. 207.

Symptoms.—The symptoms of suppuration in bone are often difficult to recognize, though, when it is the result of injury, it is

followed by deep-seated, aching pain, which is increased by sudden motion of the limb, and is especially marked at night. The skin covering the bone soon becomes red, vascular, and oedematous, and symptoms of periostitis are developed. As suppuration progresses, the cancellated tissue becomes distended, the bone enlarges, and the changes that hereafter take place resemble those of caries. The pain is not continuous, but remits sometimes for days at a time; at times lancinating and severe, at others dull and aching. However free from pain the patient may be during the remission, there will usually be found one point on the swollen bone that is exceedingly tender on pressure.

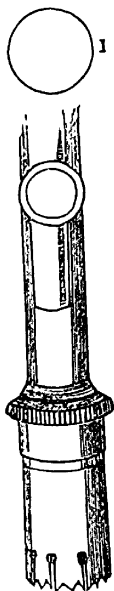
Prognosis.—The prognosis of abscess in bone is favorable, especially when it is promptly evacuated by perforating the compact substance over it with a trephine, as recommended in the treatment hereafter described.

Ulceration in Bone, in its general character, closely resembles ulceration in the soft tissues, being attended by molecular death of the portion of tissue involved, and characterized in its repair by the formation of granulations and a marked disposition to bony cicatrization. Ulceration of bone may result from simple periostitis, or osteitis, or from tuberculous and cancerous deposit, or from syphilis. Like ulceration in the soft tissues, there are two varieties of this affection, corresponding with the healthy ulcer, being true ulceration of bone; and that resembling the irritable and unhealthy ulcer, being caries of bone. This last affection will be treated of in the chapter on Caries.

Operative Procedure in Abscess of Bone.—The treatment of circumscribed abscess of bone has been given to the profession by Brodie. It consists in trephining the bone with an instrument having a small crown, so as to make an aperture for the exit of pus contained therein. So soon as a vent has been given to the matter, which is often cheesy, and occasionally very offensive in its character, the patient will experience great and permanent relief. In performing this operation, there are several points that deserve special attention. The bone must be exposed by a T or V shaped incision made over the spot which has been found to be uniformly tender on pressure, and to this the trephine should be applied. The trephine should have a small and deep crown, as seen in Fig. 208 (page 774), and it is well always to be provided with two instruments of the same

shape and size that will exactly fit the same hole, lest one become disabled by the density and hardness of the osseous case that has

Fig. 208.



to be perforated. When the trephine has penetrated to a sufficient depth, the button of bone may be removed by means of an elevator; but care should be taken not to perforate the whole thickness of the bone. The diseased cavity will generally be opened at once in this way, a small quantity of pus escaping, which may, however, be overlooked, as it is carried away in streaks with the blood which flows freely from the cut bone. Should no pus escape, perhaps a portion of dead bone or some dark and gritty masses of disorganized osseous tissue are exposed; if so, they must be removed with a gouge. But if neither of these conditions is found, the surgeon must not be disappointed, but pierce the neighboring osseous tissue in different directions by means of a perforator, when perhaps the abscess will be opened. Should it not be so, the patient will still, in all probability, be materially benefited by the removal of the circular bone, and the consequent relief to the compression of the osseous tissue. After the operation, the cavity left must be dressed from the bottom with lint saturated in *calendula* or *symphytum* lotion and the ordinary dressings applied, as recommended under the chapter on Abscesses, page 257.

Treatment.—If there is much constitutional disturbance on account of the violence of the diseased action, it must be moderated by the remedies recommended for inflammation.

The remedies that have proved of most service for disease of the osseous system, are :

For acute abscesses.—*Aconite, arsenicum, antimonium c., assafœtida, belladonna, bryonia, hepar, ledum, lycopodium, mezereum, nitric acid, mercurius, phosphorus, pulsatilla, sulphur.*

For chronic abscesses.—*Aurum, assafœtida, acid nitric, calcaria, iodine, kali iodatus, mangan., phosphorus, sepia silicea, staphisagria, teucrium, sulphur.*

Arsenicum is indicated when there is painful stiffness in the limb, and intolerable and burning pains during the inflammatory

period; or, after the pus has been evacuated, there is great prostration, brown tongue, hot, dry skin, great thirst, the secreted matter being thin and bloody, or consisting of a fetid ichor; or when the abscess threatens to run into gangrene, accompanied with great debility, chills, alternated with fever and terminating with sweat. *Lachesis* is also valuable in the stage of gangrene. *Assafetida* is particularly called for when the abscess is accompanied with tearing, tensive, sticking pains in the part, aggravated by movement; or when the abscess discharges a thin, colorless matter; and in patients that are scrofulous, with tendency to rachitis.

Aurum and *nitric acid* are of great service when the patient is possessed of a mercurio-syphilitic taint, especially when the pains are aggravated at night, the pus escaping from the diseased surface partaking of a lardaceous, cheesy character.

Belladonna, for oppressive, burning, stinging pains in the abscess, and especially in the constitutional symptoms that arise during the suppurative stage: unquenchable thirst, dry tongue, hot and pungent skin.

Bryonia and *pulsatilla* are found useful when the inflammation has not advanced very far, the skin being slightly red, with considerable swelling of the bone, and extreme sensibility to the touch; when throbbings occur in the part, with aggravation of all the symptoms toward evening and at night. *Bell.* is best adapted to persons of a nervous temperament, and *puls.* to those of a phlegmatic temperament, with lymphatic constitutions.

Calcaréa carb. is better adapted to meet the constitutional depravities that often accompany the existence of this disease; its influence exerts a more beneficial action constitutionally than locally, and on this account it is used with greater advantage in alternation with other remedies than when administered alone.

Hepar sulph., in abscesses of bone that occur in lymphatic constitutions; in persons of phlegmatic temperament, with delicate skin and brown hair; when the suppuration is profuse, the abscess presenting an unhealthy appearance, with pains aggravated at night and accompanied with exacerbations of fever. *Baryta carb.* and *carbo veg.* are also valuable remedies in suppurating surfaces, attended with burning pain, the sides of the tumor appearing hard and the edges bluish. *Lachesis* is also extremely valuable in this latter condition.

Mezereum, when there are dull, throbbing, pulsating pains in the part, and in constitutions affected with a mercurial taint, especially when the periosteum is implicated in the diseased action, with discharge of yellowish matter, and accompanied with excessive failing of strength.

Pulsatilla, when the abscess bleeds easily, with stinging and cutting pains; or when an itching, burning pain is felt in the surrounding parts, especially if varices be present, or if the abscess succeed either a violent or long-continued inflammation. *Hamamelis* is also an important remedy in this condition of the part.

Mercurius is an invaluable remedy when the constitution becomes enfeebled or impaired by scanty innutritious food; in persons of a lymphatic temperament, with *severe nightly exacerbations of pain*; when *suppuration takes place slowly*; continual thirst, coldness of the extremities, with internal chilliness during the febrile stage; the pains are of a drawing, stinging character.

Phosphoric acid, when there is burning and smarting in the abscess, with bruised sensation over the whole body, attended with great prostration, irregular pulse, profuse and debilitating sweat; also in diseases of the bones in persons of impoverished vitality.

Silicea is, perhaps, one of the most valuable of all our remedies in diseases of the bones; in abscesses, with stitching, throbbing pains; when the granulations are unhealthy, with disposition to spread; it restores suppuration when arrested by suppressed nervous influence.

Sulphur is especially serviceable in chronic abscesses, or when there is a tendency to copious suppuration dependent upon a scrofulous or psoric diathesis, or in those of a lymphatic or phlegmatic temperament.

When the pus has commenced to form, *hepar*, *silicea*, or *calc. carb.*, should be administered; but when suppuration goes on slowly, the edges thickened, *merc.* is the best remedy.

In all cases, the part should be kept at rest, and exercise taken in the open air, without, if possible, exciting inflammation in the diseased tissues. A generous and healthy diet must be recommended, and in all respects due attention given to restoration of the system and sustaining the powers of life, until complete recovery shall have taken place.

SECTION III.

CARIES.

By caries some surgeons mean a kind of ulceration of bone; others, again, a species of disintegration of the osseous tissue; and Stanly includes under this term the various changes consequent on the chronic suppuration of the cancellous structure. But caries, no doubt, properly means a disease of the bone characterized by increased vascularity, softening, and ultimate disintegration of the osseous tissue. It appears to consist in the breaking down of the organized portion of the bone, in consequence of which the earthy matters become eliminated in a granular, molecular, and almost diffluent form, in the pus formed by the inflammation of the surrounding more healthy structures.

On examining a portion of carious bone, it will be found to be porous and fragile; of a gray, brown, or blackish color; in portions broken down in softened masses, and in others hollowed out into cells, which contain a reddish-brown and oily fluid. The process of wasting which goes on in the bone appears to be partly the result of ulceration and partly of disintegration of its tissue. In many cases small masses of dead bone lie loose and detached in the carious cavity. These changes are most commonly met with in the cancellous structure, but the compact tissue may likewise be affected. As it so frequently occurs in the cancellated tissue, it is commonly met with in the heads of bones; and here the disease is extremely dangerous, being apt to undermine and destroy the contiguous articular cartilage, and thus implicate the joint. This caries of articular ends of bones is consequently a most serious affection, and is a very frequent cause of incurable joint disease, such as suppuration and destruction of cartilage, followed, perhaps, by partial ankylosis. Any bone may be affected by caries, but it is, perhaps, more frequently met with in the short and cancellous bones.

Caries occurring in strumous constitutions, and affecting the short bones, as those of the tarsus, or the cancellated heads of long bones, as the tibia, usually if not always commences in the center of the bone, which becomes congested, softened, and disintegrated, in many cases without any external cause, but apparently simply from

the diminution of vitality in those parts of the osseous structures furthest from the periosteum, and which do not, like the deeper structure of a long bone, receive a supply of blood from an internal or medullary membrane. In these cases, the inflammation of the soft investing parts, and the destruction of the joint, which usually ensues, is consecutive to the disease in the bone.

Symptoms.—The symptoms indicative of the occurrence of caries are of a very equivocal character, and are not unfrequently, in the early stages, mistaken for those of ordinary phlegmonous abscess or rheumatism. They consist of pain in the bone, with a good deal of redness and swelling in the soft tissues covering it; abscess at last forms, often of considerable size, and on letting out the pus the character of the disease will be recognized, as the bare and rough bone may be felt with a probe, which sinks into depressions upon its surface, which, though rough, yields readily to the pressure of the instrument. The cavity of the abscess gradually contracts, leaving fistulous openings which discharge a fetid pus, usually dark and sanious, intermixed with granules of bone, and containing a superabundance of the phosphates. The fistulous openings are generally surrounded or concealed by high spongy granulations, and the neighboring skin is duskily inflamed. Caries usually occurs in constitutions that have been debilitated by struma or syphilis, often without any other apparent cause. In syphilitic constitutions it is apt, however, to affect the surface of the bone, disintegrating and eroding this in a remarkable manner. This condition has been described by Stanly as true *ulceration of bone*, and he regards it as distinct from caries, and analogous to ulcers of the soft parts. Here the disease does not penetrate deeply, but leaves the surface rough and porous, with a good deal of inflammation in its soft parts around the affected bone. He states that it only occurs in adults, and in males, and is very chronic in its character; it is met with primarily in the bones of the spine, but also occurs on the articular surfaces in advanced stages of joint-disease.

Treatment.—The treatment of caries must be conducted not only with reference to the diseased condition of the bones, but also as to the constitutional cause that occasions it, the removal of which is an important and essential element in effecting a cure. If it arise from syphilis, this must be eradicated; if from struma, the general health must be improved. Where causes such as these are operating

not only to produce but to keep alive the disease, it will be found impossible to effect a cure so long as the constitutional dyscrasia exists. By removal of causes such as these, the disease will often cease spontaneously, and the cure become complete, especially in young subjects. Hence, it is better, in caries of the small bones of children, to exhaust all constitutional treatment before resorting to operative means. Cases have been frequently seen of caries affecting the bones of the hands and feet, in which an operation seemed almost indispensable, get well spontaneously by change of air and general attention to the child's health.

In the first or inflammatory stage of caries, the agents recommended under "Inflammation" will subdue the activity and limit the extension of the disease; then the *constitutional* remedies should be employed and continued until all evidences of the disease have passed away. During treatment, it is advisable to give the patient the benefit of change of air, more especially to the sea-side, or the more elevated and salubrious districts of Minnesota and Wisconsin. After the disease becomes chronic, and the remedies employed do not seem entirely competent to effect its elimination or restore the integrity of the part on account of the local disturbance continually going on in and about the carious bone, an operation should be advised, but never during the inflammatory stage.

There are three kinds of operations to be performed upon carious bones: *first*, the simple removal of the diseased portion; *second*, excision of the articular end; *third*, amputation of the whole of the bone diseased.

The removal of the carious portion of bone is best effected by means of the gouge, especially in the short, thick bones, or the articular ends of long bones not implicating the neighboring joints. In applying the gouge, the diseased portion should be exposed by a crucial excision, and if necessary its cavity opened by a small trephine, as shown on page 774. The gouge, fixed in a short, round handle, is then freely applied until the diseased structures are entirely scooped and cut out. To facilitate this operation, the surgeon should have gouges of different sizes, in order to adapt them to the surfaces to be scooped out or cut away. The gouge forceps and osteotrite are useful instruments in cutting away angular fragments and projections of bone, as well as removing the softened carious structure without risk to the neighboring healthy tissues.

In removing carious bone with instruments, it is necessary to know when the surgeon has cut away enough. He will ascertain this by the difference of texture between diseased and healthy bone, the former cutting soft and gritty, and yielding readily before the instrument, while the latter is hard and resistant. When all the disease is removed, the walls of the cavity left will be felt smooth and compact. Carious bone may be distinguished from healthy or inflamed bone by immersing it in water and cleansing it. If carious, after washing, it will appear either white or black; but if healthy and inflamed, it preserves its reddish tint. In operating on young children especially, it is recommended to have the edges of the gouges a little blunted, lest damage be done to the remaining sound bones. When all the diseased structure has been removed, free use should be made of the syringe, in order to effect thorough cleansing of the diseased cavity. Unless this is done, more or less bony particles will be left, thus keeping up irritation and discharge, and interfering considerably with the reparative process. More or less *hemorrhage* follows these operations, the blood proceeding either from small arteries or from numerous points, as from the pores of a sponge. Ligature in the first case will be required, more particularly as the vessels are unable to retract on account of the induration of the contiguous tissues; while in the latter, frequent applications of cold water will be sufficient to arrest the hemorrhage. Should this, however, not control the flow of blood, the cavity should be filled with pledgets of lint saturated in a styptic solution of *crigeron*, *hamamelis*, or the *persulphate of iron*, the stuffing being retained no longer than is necessary to control the bleeding.

After arrest of the bleeding, the cavity should be filled with charpie or lint, saturated in *calendula* or *symplytum* lotion, the edges of the wound loosely approximated by adhesive strips, a roller applied around the limb, beginning at its distal extremity, upward to beyond the seat of operation, and the limb placed in a favorable position for drainage. Water-dressings may be used afterward, simple or medicated, as the case may seem to demand, and the proper remedies administered internally. The bony cavity should be well washed out at least once a day with castile-soap and water, and the *calendula* dressing reapplied. The chief dangers that follow this operation are pyemia and erysipelas—results which

it is only necessary to mention to secure the earliest attention of the surgeon.

Excision of an entire bone is sometimes necessary for the relief of this disease, and the carpal and tarsal bones more frequently than all others demand this operative procedure, a useful limb being generally left after the removal of several of these bones. In the long bones, resection is usually limited to the articular end, or to this and a portion of the shaft. These operations will be referred to in detail in the chapter on Resections, under the head of Operative Surgery.

Amputation should only be resorted to as a dernier resort, and when all other means have failed in effecting a cure. When it is impossible to control the disease by the means advised, and the attendant discharges are so copious as to give rise to profuse night sweats, marasmus, and colliquative diarrhoea, amputation of the limb comprising the carious bone will afford the only chance of safety, and should be performed without delay.

Treatment.—The remedies of value in the treatment of this disease are *angustura*, *assafæt.*, *baryta*, *belladonna*, *carbo. veg.*, *calcareæ*, *dulcam.*, *fluoric acid*, *lycopodium*, *phosphorus*, *pulsatilla*, *mangan.*, *mezereum*, *mercurius*, *staphisagria*, *silicea*, *sulphur*.

Angustura is useful in caries in persons who have been much addicted to the use of coffee.

Assafætida, in caries, necrosis, and exostosis, when occurring in the long bones of the extremities.

Aurum, especially in caries of the bones of the face and nose, where the disease is complicated with mercurial taint.

Belladonna, in caries of the bones of the palate, and of the forehead, and also in caries producing curvature of the spine.

Calcareæ, in distortion of the spine, and of the long bones of the extremities, softening of the bones, caries and exostosis in the arms and legs.

Dulcamara, in caries and exostosis in the bones of the arm, accompanied with suppuration, especially when caused by the repercussion of scabies.

Lycopodium, in caries of the bones from scrofula, mercury, and syphilis, the accompanying discharge being thick and yellowish.

Mercurius, in caries uncomplicated with poisoning of the drug.

Mezereum, in caries affecting the bones of the legs and arms, in scrofulous subjects.

Phosphorus, in caries of the cranial and facial bones, with lacerating and boring pains.

Pulsatilla, in caries of the spine, producing distortion of the vertebral column, and especially in children when the fontanels close tardily.

Ruta, in caries caused by mechanical injuries.

Sepia, in caries of the bones of the extremities.

Silicea, in caries affecting either of the bones in the body. This, as well as *calc.*, is one of the most efficacious remedies for diseases of the bones.

Sulphur, in caries of the bones occurring in scrofulous subjects.

§ 1.—Caries of the Vertebrae.

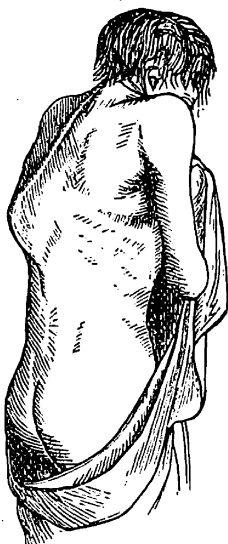
This disease, which consists, when fully developed, in destruction of the bodies of the vertebrae, with disintegration of the inter-vertebral fibro-cartilage, most commonly occurs in young children, sometimes but a few months old; but is not unfrequently met with at all ages up to that of thirty. It has always been considered a strumous affection, consisting essentially in tubercular infiltration of the bodies of the vertebrae, followed, as commonly happens in this morbid condition, by congestion, caries or necrosis of the osseous tissue that is in contact with or at the seat of the deposit. In consequence of these changes going on in the bodies of the vertebrae, they become thinned, eroded, and gradually hollowed out anteriorly. The disease is usually limited to the bodies of the vertebrae, leaving the spines, the arches, and the tubercles unaffected; but in some instances even these structures, which are of a more compact character, become eventually implicated. In this way the bodies of from three to six or eight of the vertebrae may be destroyed, the corresponding inter-vertebral fibro-cartilages, which derive their supply from the contiguous bones, becoming disorganized as these undergo destruction. These changes commonly occur about the middle dorsal vertebrae; if extensive, they may implicate the upper or lower dorsal, or lumbar, and always give rise to angular projection backward of the diseased part of the spine, corresponding in extent to the amount of destruction of the vertebrae. The mechan-

ism of this excurvation, which is the most marked feature in this disease, is easily understood by reference to the pathology of the affection. The bodies of the vertebræ being thinned and weakened, at last give way under the pressure of the weight of the upper part of the body; and the remains of the disintegrated bodies being fused together, cause the upper part to bend over, and the spine to project posteriorly. The degree of bending forward and of posterior excurvation corresponds to the amount of destruction in the bodies of the vertebræ. It is seldom that the spinal marrow becomes compressed or injured during the progress of this disease. In some cases, however, more particularly in adults, it becomes softened opposite the seat of curvature, and thus paralysis may be occasioned.

Symptoms.—The symptoms of the disease, when it is fully developed, are well marked; but in children it often comes on very insiduously, commencing with a degree of weakness in the back, with an inability to stand upright, and with a tendency to lean the body forward, or to support it by resting the hands on the knees, or seizing hold of anything that will serve as a temporary support. On examination, a few of the spines about the middle of the back will be found to be a little more prominent than the rest, and, on pressing or tapping them, pain will be complained of. The child usually becomes stunted in its growth, and, if the disease is not arrested by proper treatment, continues more or less hump or round backed for life. In other cases it will run on to the formation of abscess, strumous manifestations occurring elsewhere, and death eventually resulting, if not combated and cured by appropriate medication.

In adults, the symptoms will vary somewhat according to the seat of the affection. It is most dangerous and rapidly fatal when the cervical vertebræ are implicated, for, as the bodies of these are shallow, caries rapidly penetrates to the spinal canal and the cord may thus be irritated. When the dorsal or lumbar vertebræ become diseased, the affection is not of so immediately serious a character

Fig. 209.



A view of the antero-posterior deformity—caries of the bodies of one or two vertebræ.

to life, though it may be to the figure, of the patient. In adults it often commences with pain in the loins or back, apparently of a rheumatic character, shooting round the body or down the thighs. On examining the spine, which feels weak to the patient, tenderness on pressure or on tapping will be experienced at one point, and he will wince when a sponge wrung out of hot water is applied to this part, although there may be no appearance of excoriation. The lower limbs now become weak, and the patient walks with a peculiar, shuffling, tottering gait, the legs being outspread and the feet turned out. The weakness of the limbs is especially marked in going up stairs, and may be tested by directing the patient to stand unsupported on one leg, and raise the other so as to place the foot upon the seat of a chair, which he will probably be unable to do. The deformity of the spine now slowly increases, the patient becomes unable to stand, and spasms of the muscles of the lower extremity come on, together with a tendency to relaxation of the sphincter ani, and retention of urine. Abscess now commonly makes its appearance, and in some cases it occurs before any other signs, except pain and weakness of the spine, but certainly before any deformity has taken place. When the abscess forms, as Mr. Stanley has observed, the pain and irritation of the spinal cord are usually lessened for a time.

When abscess forms in connection with diseased spine, it is probably the result of continued irritation of the tuberculous deposit, and it may become the most prominent and marked feature of the affection, giving rise almost to a distinct and independent disease. The situation and course of these abscesses depend entirely upon the part of the spine affected; thus, for instance, when the cervical vertebræ are diseased, the abscess may come forward behind the pharynx, and may occasionally extend under the sterno-mastoid muscle to the side of the neck, where it opens; sometimes, though very rarely, it may pass into the chest, and in other cases down into the axilla. When the disease is seated in the dorsal vertebræ, it usually passes forward under the pillars of the diaphragm down the side of the aorta and the iliac vessels into the iliac fossa, and then presents through the anterior wall above Poupart's ligament. In other cases, again, when the lower dorsal or upper lumbar vertebræ are diseased, the pus gets into the sheath of the psoas muscle, thus constituting the common affection termed "*psoas abscess*";

and passing along this, under Poupart's ligament, presents itself in the thigh; or it may continue its course downward to the calf or ankle.

Diagnosis.—The diagnosis of caries of the spine is made at the first sight of a patient affected by the disease when once the angular deformity has taken place. It is, however, difficult before excurvation occurs, being only indicated at this period by the existence of pain in the back, and by symptoms of spinal irritation. At this stage it may be mistaken for spinal or intercostal neuralgia, for rheumatism, or for chronic nephritis. The persistence, however, of a continuous fixed pain in the back should always lead to a suspicion as to the true nature of the disease, lest an error be committed in treating as mere neuralgia or rheumatism, what may turn out to be incurable disease of the spine itself. Here the tenderness on pressure, the increased sensibility to the application of heat, with a tendency, though it be very slight, to projection of some of the spines, the feeling of weakness in the back, and especially the occurrence of these symptoms in early childhood or youth, at a period when other diseases rarely occur, would lead one to suspect the true nature of the affection.

Prognosis.—The prognosis in caries of the spine is exceedingly problematical, the deformity always continuing more or less marked, and the patient, though he may eventually recover, by ankylosis taking place, continues hump-backed in after life. Very commonly the disease terminates in abscess and death. It was long ago remarked by Boyer that the most fatal cases were generally those in which the spine preserved its straight position; whereas, when it was much curved, death seldom resulted. The truth of this remark has been frequently verified by surgeons; and the circumstance would appear to be owing to the fact that when the spine continues straight at the same time that the bodies of the vertebræ are tuberculous and carious, ankylosis can not occur, the spinal canal is opened, and the cord irritated; whereas, when they have fallen together, and very considerable gibrosity has resulted, ankylosis more readily takes place, and thus an imperfect cure is effected.

Treatment.—When the disease occurs in infants, no advantage can be derived from mechanical appliances, and all that can be done in this connection is to place them upon a pillow in a prone condition, on a small couch made for the purpose. The general health

demands attention, and all that can be done by constitutional remedies, change of air, etc., etc., toward improving the system, should be diligently employed and systematically carried out. It is in this class of diseases that a proper and scientific course of homœopathic treatment infinitely excels the *tonic* and *counter-irritant* practice of the allopathic school. While by the one the natural powers of the system are sustained and assisted in their efforts to overcome the morbid process that is slowly but surely undermining the constitution, in the other the vital energies are being rendered weaker and weaker by the crude and massive doses, until nature is no longer able to bear up against the continued shock imposed upon her, and death ensues as the legitimate result of over-medication and consequent taxation of an already-weakened organism.

In older children and adults, much benefit may be derived from the use of exercise properly taken, and well-adapted mechanical appliances, when the disease has become developed and curvature of the spine has taken place. These important means of cure will be more fully spoken of in the conclusion of the section on Curvature of the Vertebral Column.

In the earlier stages of the affection, patients should be strictly forbidden to walk, stand, or sit upright; they should be rigidly confined to the prone couch, and a careful system of treatment recommended, with a proper regard to the constitutional cachexy developing the disease. Lotions should be applied to the spine consisting of one part of *symphytum*, *ruta grav.*, or *arnica*, to nine parts of water, having either side of the spine well bathed with these applications two or three times a day. Salt-water sponge-baths to the whole length of the spine, and the occasional use of the electro-magnetic current, will frequently be found of great service during the treatment.

Rest is an all-important element in the successful conduct of the case. If the patient be permitted to sit, or stand erect, the weight of the head and shoulders will tend to curve forward the weakened spine, and by pressure increase the already-existing irritation within. The horizontal position relieves the diseased parts of this additional source of distress. It is on this account that the prone position is so much more preferable to the supine. The patient, if old enough, should be kept upon the prone couch until the parts shall have become sufficiently firm to sustain the organs above. When the

disease has been arrested by this means of treatment, and the constitutional powers have become invigorated, the patient may be permitted to get up and move about by wearing proper stays so as to support the trunk. It is of considerable importance in the treatment of this disease that the patient be not allowed to move about too soon and before consolidation of the diseased vertebræ has taken place; otherwise, he runs a great risk of a speedy relapse or an increase of the curvature.

If an abscess has formed, the surgeon should be in no haste to open it, lest injurious and too often fatal constitutional irritation may occur. If the matter approaches the surface closely, and it becomes necessary to give it exit, an opening should be made by means of a valvular incision, which should be closed as soon as the matter has been discharged, by the hair-lip suture, as described on page 169. If there arises any hectic or constitutional irritation throughout the disease, it must be treated in accordance with the principles laid down under those headings.

The internal treatment mostly to be relied on for the cure of this affection consists in the proper selection of one or more of the following remedies, according to their indications, which will be more fully described in the concluding chapter on these diseases: *Ac.*, *arn.*, *assaf.*, *ars.*, *baryt.*, *bell.*, *bry.*, *calend.*, *calc. c.*, *carb. veg.*, *con.*, *dulc.*, *eupat.*, *graph.*, *lach.*, *hepar sulph.*, *merc.*, *lyc.*, *mezer.*, *nit. ac.*, *phosph.*, *puls.*, *rhus*, *ruta*, *staph.*, *sil.*, *sab.*, *sulph.*

SECTION IV.

LATERAL CURVATURE OF THE SPINE.

This affection, on account of the frequency of its occurrence and the tediousness of its cure, has received a good deal of attention from various surgeons, and much has been written upon it by those who have specially devoted themselves to its treatment, but yet the whole of its pathology and management lies in a very narrow compass.

Lateral curvature of the spine most commonly commences at an early period of life, usually between the ages of twelve and eighteen, seldom before the one and not very commonly after the other; it

rarely, it is said, if ever, occurs but to females. It appears to consist simply in a relaxation of the ligaments and muscles of the spine, in consequence of which the vertebral column, being no longer able to support the weight of the head, neck, and shoulders, becomes curved to one side, a corresponding deviation taking place

Fig. 210.



Lateral curvature of the spine.

in the opposite direction at a lower portion of the spine in order to preserve the equilibrium between the two sides of the body; Fig. 210. The first curve usually takes place in the upper or middle dorsal region, the convexity tending toward the right side; the second or compensating curve occurs in the lumbar region, the convexity toward the left, Fig. 211. Occasionally there is a quadruple curve. At the same time that these lateral curves take place, there is always a tendency to rotation of the bones of the spine upon one another. This twist is sometimes slight, but in some instances it is very marked, so that there is a double curvature, lateral and rotary. On examining the bones and inter-vertebral fibro-cartilages after death, even in cases of very considerable distortion, no disease will appear in them, except, perhaps, that the bodies of some may have been

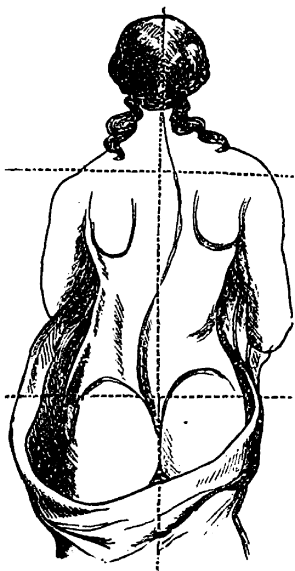
slightly compressed where they form the principal concavity of the arch. The ligaments appear to be stretched, relaxed, and somewhat weakened in these cases; and the muscles are usually pale, flabby, and apparently wanting in power.

Etiology.—These various kinds of deformity chiefly occur in girls about the age of puberty; at a time of life when the tonic of the muscular system not unfrequently becomes lessened by the occurrence of anemia and those states of impaired health that so frequently attend the establishment of the uterine functions; and before the osseous and ligamentous structures of the body have fully developed. At this period of life, also, it frequently happens that the spine becomes rather suddenly elongated by a rapid increase in growth taking place, or that it becomes overweighted by the system developing itself, the shoulders and bust becoming stout and expanded. Indeed, so frequent is the occurrence of a certain degree

of lateral curvature of the spine from these various causes, about the age of puberty in girls, that few escape a tendency to deviation, of so slight a kind, however, as not to admit of recognition as a disease. But if this tendency be allowed to go on unchecked, or if it be increased by injurious habits, among which are all one-sided postures in which the body is twisted, as in playing some musical instruments, or in leaning over a table in drawing or writing, the slight deviation may rapidly increase until it assumes the true characters of lateral curvature of the spine. Among the more common predisposing causes must undoubtedly be reckoned the indolent and sedentary occupations, and the luxurious, enervating habits that are commonly encouraged in girls in the higher ranks of life, and which, by preventing due muscular development at the same time that they induce a general loss of tone in the system, may distinctly occasion the disease.

Signs.—The signs of this affection, when it is well marked, are distinctly obvious. The serpentine character of the curve, its double nature, the convexity on one side looking to the right shoulder, and on the other to the left loin, will render its nature evident; Fig. 211. Most commonly it commences in a gradual manner, the first condition that frequently attracts attention being a prominence of the right scapula, which is supposed to be “growing out”; or the sterno-clavicular articulation on the same side, or some of the cartilages of the ribs have been observed to project. Whenever the surgeon is consulted for such symptoms as these, he should at once examine the spine, which he generally finds inclined to the right side. In the early stages of the disease, when the deviation is not very distinctly marked, the readiest method of determining it is to let the patient stand upright, taking care that the feet are well placed together, and that the attitude is not forced but natural; the surgeon should then run his finger down the back from one spinous process to another, touching each

Fig. 211.



as he passes it with a pen dipped in ink; in this way, when he has reached the lower part, he will have mapped out the course of the vertebral column, and thus may see at a glance the nature and extent of its displacement. At the same time he will probably observe that the two hips do not exactly correspond, the left being somewhat thrown out. Very commonly there is a good deal of neuralgic tenderness about the spine, and at this early stage there may be anemia and symptoms of impaired nutrition. As the disease advances, the curvature becomes more distinct, and at the same time, owing to the torsion of the column, assumes a slightly angular character where most convex. The ribs on the right side are thrown out and bulging, and carry up the scapula with them, while those on the left are sunk and depressed.

Treatment.—In the treatment of spinal curvature of whatever variety, the indications are: *first*, to prevent displacement and the formation of a curvature; *second*, to pay attention to the patient's general health, with a view of removing, if possible, the constitutional dyscrasia that exists, and upon which the local disease often depends. Thus, if the pathological condition depends upon a strumous, mercurial, or syphilitic taint, the duty of the surgeon is to rectify, if possible, the constitutional cachexy by those remedies which are specifically adapted to one or the other of these disordered conditions. Three important principles of treatment are recommended to be adopted in the management of the case. The *first* is to improve the general health; unless this is effected, all other means will be of little avail. The *second* is to give tone and vigor to the muscles of the spine. The *third*, to take off from the diseased part its superincumbent weight. The improvement of the general health can best be accomplished by either one of the following medicines, selecting that one in preference that corresponds most closely to the totality of the symptoms. It will be impossible, and indeed impracticable, in a work of this character, to give all the indications of remedies to be employed throughout the treatment of this affection. Their appropriateness will be shown by a careful and systematic study of the materia medica. The following are the remedies recommended: *Assafat.*, *bell.*, *calc.*, *jodat.*, *lycopod.*, *merc.*, *mezer.*, *nit. ac.*, *petrol.*, *phosph. ac.*, *phosph.*, *puls.*, *rhus*, *ruta grav.*, *symp.*, *silicea*, *sulphur*.

For curvature of the spine, *bell.*, *calc.*, *phosph.*, *lyc.*, *silicea*, *sulphur*, are remedies of great value.

If the patient be a female, attention must be given to the condition of the uterine functions, and any irregularity be promptly cared for. At the same time good nourishing diet should be allowed, and the patient encouraged to take exercise in the open air as much as possible, without inducing fatigue. The muscles of the back may be more directly strengthened by frequent spongings of salt water, or whisky and water, every morning, and methodically rubbed from top to bottom. The friction should be principally directed to the erector-spinae muscles on either side of the vertebral column, and may frequently be done with the hand alone, and occasionally with some slightly stimulating ointment. At the same time, if the patient's strength will permit of it, but not otherwise, calisthenic exercises may be practiced, or the hand-swing be permitted. These, however, should not be indulged in to the extent of producing exhaustion or fatigue. The movement-cure of Dr. C. F. Taylor, if properly and systematically carried out, will effect much toward developing the tone and natural harmony of the spinal muscles. In regard to this, he says: "When the muscles act in harmony—the different groups being properly set off by their respective antagonists—then the spinal column, whether at rest or in motion, is always where it should be. But if the action of certain muscles is not properly antagonized, then this harmony or co-ordination is lost, and the spine makes a greater flexion toward the point where is the stronger muscular action, if this action is in the transverse direction, as of the scapular muscles acting at the *middle* of the spinal column; but *from* the stronger muscular force when acting from one side at the *ends* of the flexible column longitudinally. That is, the *spinal* muscles act like a string to a bow; and if they contract more on one side, the ends of the spine are made to approximate toward that side, making the spine to swell out toward the other side; but the scapular muscles, acting at the middle, would draw the spine toward themselves: and thus this unequal muscular action may cause the spine to deviate to the right or left, to and from the stronger muscles, according as they may happen to be those that act longitudinally or transversely." While the patient is undergoing the proper physical training and development of the spinal muscles, and after each exercise, he should be made to lie in a

recumbent position on a hair or moss mattress for a few hours, and not be permitted to stand or sit. If these means are continued for a length of time, together with the constitutional remedies indicated, the back will be strengthened and further increase of deformity prevented. In this way slighter cases may be entirely cured and the more developed ones be materially benefited. If the patient has not undergone treatment until the disease has further advanced, the same course of treatment must be adopted as previously recommended; and in addition thereto mechanical contrivances must be adapted to the body to take off the weight of the head and shoulders, and to relieve the parts of the continued irritation produced thereby. This may be effected either by keeping the patient in a recumbent position, or permitting him to go about, wearing proper supports. The recumbent position, though of exceeding great value in conjunction with other means of treatment, is productive of more harm than good when employed as an exclusive plan. Of all the recumbent positions, the *prone* is the best suited to the treatment of all curvatures of the spine, and Verral's is decidedly the best couch for the purpose now employed. The patient should be kept in the prone position during the intervals of exercise, not being permitted to sit or stand during meals even. It may be difficult at first to accustom the sufferer to this position, but a little schooling will soon enable her to adopt it as a means of temporary relief, as well as permanent benefit.

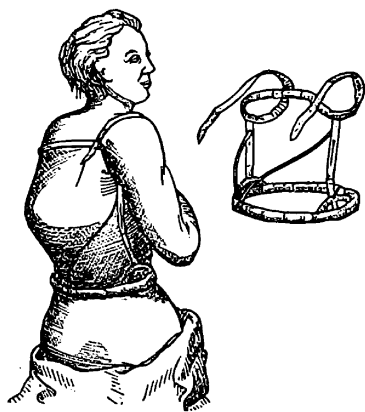
A variety of mechanical appliances for supporting the weight of the head and shoulders have been constructed, and much ingenuity has been expended of late years in the invention of suitable apparatus, of which there is consequently a large amount before the profession, all constructed upon the same principles, although possessing different degrees of merit. It may be stated, as a general rule, that the more light, airy, and simple such an apparatus is, the more comfortable it is to the patient, and the better adapted to the removal of the distortion. The principle of action of the contrivances referred to is shown in the accompanying figure, with a description of its use and application, Fig. 212 (on page 793). In some cases it may be necessary to attach a piece to support the head. With such an instrument, the patient may take gentle exercise in the open air, either on foot, in a carriage, or on horseback, as may be found most convenient or suitable. A

great deal has been recently said respecting the beneficial effects of *myotomy* as a remedy for the cure of lateral curvature of the spine, and it seems that almost every muscle of the back has been divided for this purpose.

M. Guerin, occupying the first rank in the profession in this specialty, has performed very many operations of dividing the muscles of the back for distortion, with, as it seems, equivocal success. Judging from the beneficial results that have followed this operation in wry-neck, club-foot, and strabismus, it is not unreasonable to conclude that equally advantageous benefits may follow its application to the various dis-

tortions of the spine. The ablest and best surgeons of this and other countries have indorsed this operation in reference to its applicability to lateral and other curvatures of the vertebral column. The remedies recommended under the head of Caries of the Vertebræ, page 787, are to be consulted in the disease before us.

Fig. 212.



A full view of a "shoulder-brace," or spinal support, adapted to the treatment of curvature of the spine, when due to disease of the bodies of the dorsal or lumbar vertebræ. The lower band fastens around the hips, while the crutch-like pieces pass under the armpits, and thus take the weight of the upper extremities off the spine. (After nature.)

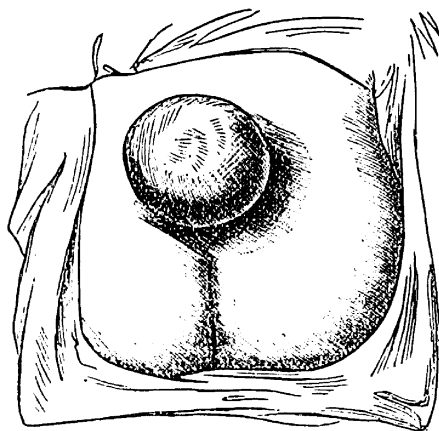
SECTION V.

SPINA BIFIDA, OR HYDRO-RACHITIS.

It occasionally happens from congenital malformation that the spinous processes of some of the vertebræ are deficient, and their laminæ either absent or separated. In consequence of this, the meninges of the spinal cord in this situation are unprotected, and project through the aperture in the bones, giving rise to a tumor at the part where the arrest of development in the osseous structure occurs. This tumor is usually of an oval shape, its long axis corresponding to that of the spine. It is generally met with about the

size of a walnut or an orange (Fig. 213), but occasionally it attains an immense bulk, equal to that of a child's head. In some cases this tumor is lobulated, having an imperfect septum

Fig. 213.



A full view of spina bifida of the lower part of the lumbar vertebrae. (After a cast from nature.)

stretching across it; in other instances, two or more of these tumors have been met with in the spine. The skin covering it is usually of a normal color, but when the tumor is of considerable size it may have a bluish or congested appearance and admit of a certain degree of transparency. Upon examining the tumor, which is hard, though elastic, when the child is held upright, it will be found that it becomes soft when the child is laid horizontally. It usually becomes hard during expiration and soft during inspiration. In some cases fluctuation is perceptible, and by pressure the bulk may be lessened. Spina bifida may be met with in any part of the vertebral column. It is, however, almost invariably found in the lumbar region, the cases in which it appears higher up being of very rare occurrence; but instances of this kind are mentioned by Cruveilhier. When it occurs higher up in the cervical or dorsal spine, it has been found that the spinal cord and nerves are usually adherent to the walls of the tumor; when in the lumbar region, this is not the case.

The prognosis of this affection is necessarily unfavorable, the child usually dying, at an early age, of convulsions. In other cases the tumor increases in size, gives way, and death results from spinal meningitis.

Treatment.—In the treatment of spina bifida but little can be done in the way of operation when the tumor is of very large size and the skin covering it inflamed or ulcerated, or when a large portion of the bones appear to be deficient. In those cases, however, in which the child is otherwise strong and healthy, the tumor

being of small size at its base, or pediculated, and in which little pain or other inconvenience arises from pressing upon it, some means may be adopted for relieving or curing the deformity. This may be done by constant pressure with collodion and a common roller, or a cup-shaped truss lined with a thin air-cushion, so as to diffuse the pressure equally over the entire swelling. This compression may be aided by the occasional evacuation of the contents of the sac by subcutaneous puncture with a very fine trocar or bistoury, the opening being firmly closed immediately afterward to prevent the entrance of air within the sac. It is better to draw off only a portion of the fluid at a time, and perform the operation frequently rather than run the risk of convulsions and death from shock to the brain from sudden loss of pressure caused by the escape of the cephalo-spinal fluid. Sir Astley Cooper treated successfully a case of cleft spine by pressure alone; favorable results have also followed this plan of treatment both in Europe and in this country.

Benjamin Bell suggested the removal of the tumor by ligating its base, but the results thus far have been quite unsuccessful. The only case in which ligation should ever be performed is when the sac has an uncommonly narrow pedicle, with an exceedingly small aperture of communication; but even then the safer practice is compression, with occasional puncture.

Dubois, having in view the hope of gradually diminishing the size of the tumor and of ultimately agglutinating the serous surfaces at its base, proposed the application of pressure, at this particular point, by means of two narrow steel plates regulated by screws, and prevented from slipping by passing two stout needles immediately in front of them across the swelling. He succeeded in this manner, it is alleged, in curing his patient. "I am not aware, however," says Gross, "that it has succeeded in the hands of other surgeons; and I can discover no material difference, either in point of principle or practice, between it and compression with a ligature." It has also been proposed to cure spina bifida by injections of *iodine*, and the operation has been performed several times, but almost always with a promptly fatal result. The chief objection to this method of treatment is, that it is impossible to circumscribe the resulting inflammation sufficiently to prevent it from spreading to the spinal cord and its envelopes.

The internal remedies upon which the greatest reliance can be placed for the cure of this disease, are: *ars.*, *arn.*, *assaf.*, *baryta*, *bell.*, *calc. c.*, *calend.*, *can.*, *carbo v.*, *dulc.*, *eupat.*, *graphites*, *hepar s.*, *lach.*, *lyc.*, *merc.*, *mezer.*, *nitric acid*, *phosph.*, *ruta*, *sepia*, *staph.*, *sulphur*.

SECTION VI.

NECROSIS.

The transition from caries to necrosis is easy. *Caries* may be regarded as the granular disintegration or molecular death of osseous tissue, conjoined with suppuration of the surrounding healthy parts; while *necrosis* must be looked upon as *the death of the osseous tissue as a whole*, a condition, indeed, closely resembling that of gangrene of the soft parts. While caries, however, chiefly affects the cancellous structures, necrosis is met with in the compact tissue of bone, and far more frequently occurs in the shafts than in the articular ends of long bones. It is, however, occasionally found in the cancellous structure; thus, in the head of the tibia, or in the os calcis, small masses of necrosed bone are not unfrequently found lying in the midst of carious or suppurating cavities. The different bones are affected by necrosis with varying degrees of frequency. The tibia, at its anterior part, is most frequently diseased; the femur in its lower third is also very commonly affected. The lower end of the humerus is not so often necrosed; but not uncommonly the phalanges of the fingers from whitlow, the cranium from syphilis, the lower jaw from the exhalations evolved in the manufacture of phosphorus matches, and the clavicles and ulna from injury or constitutional causes, are found affected by necrosis.

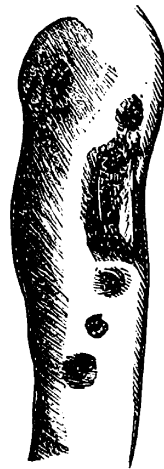
Causes.—The causes of necrosis are of various character. We have just seen that it is predisposed to by the structure of particular parts of bone; it is frequently the result of scrofula, syphilis, and those cachectic conditions of the system that sometimes follow typhus fever; also, exposure of the bone from various causes, such as whitlow, abscess, or the impairment of its vitality by injury of whatever character.

In whatever way it originates, the necrosis may affect the outer lamina of the bone only, when it may be denominated *peripheral*; or

the innermost layers that surround the medullary canal may perish, and then it may be termed *central*; or the whole thickness of a shaft, or of the substance of a short bone, may lose its vitality. The portion of bone that is necrosed, called the *sequestrum*, presents peculiar characters, by which its nature may at once be recognized. It is of a dirty yellowish-white color, and has a dull, opaque look, and after exposure to the air it gradually becomes of a deep-brown or black tint; the margins are ragged and more or less spiculated, and the free surface tolerably smooth, but its attacked surface is very irregular, rough, and uneven, presenting an eroded or worm-eaten appearance. When the sequestrum forms in the cancellous structure, it is usually of a blackish-gray color, irregular but somewhat ovoid in shape, as if the bony matter had been partially dissolved away, and is here frequently conjoined with caries of the surrounding bone.

Symptoms.—In all cases, necrosis is ushered in by symptoms of local inflammation of a more or less intense and painful character: the skin becoming glazed, œdematous, and of a purplish-red tint; abscess, often of large size and discharging great quantities of fetid and bloody pus, forms in the limb, and burrows widely among its cellular planes, in proportion to the extent of the necrosis. If the suppuration be not so extensive as to jeopardize life—as occasionally happens when the thigh is the seat of the disease, the patient sinking into rapid hectic—the suppurating cavity will gradually contract, leaving fistulous and sinuous tracts, often of great length and extent, leading to rough and bare bone, discharging a fetid and ichorous pus, and having their orifices surrounded by protuberant and glazed granulations. On introducing a probe into these channels, the instrument passes through apertures in the bony case, termed *cloacæ* (Fig. 214), at the bottom of which the dead bone will be felt rough and bare. Though this is the general condition that occurs in central necrosis, it occasionally (but rarely) happens that a small portion of some of the internal lamellæ of the bone dies, and, being included in a greatly-thickened case of the new bone, gives rise to

Fig. 214.



Necrosis of the tibia, showing a large cloaca with the sequestrum protruding.

symptoms of osteitis, closely resembling circumscribed abscess of bone, but not to those characterizing necrosis. When the whole thickness of a shaft dies, the symptoms are always of a very acute kind, the extent and gravity of the inflammatory and suppurative condition being proportioned to that of the amount of bone that loses its vitality.

Acute necrosis often attacks the long bones, especially the tibia and femur. In these cases violent and deep-seated pain occurs in the limb, which swells greatly. Abscess soon forms along the whole line of bone, great constitutional disturbance ensues, and, unless the limb be amputated, death will usually speedily result. This form of necrosis chiefly occurs in young and cachectic subjects.

The *process of separation* of the dead bone, and of the formation of a new osseous tissue to supply the place of that which is necrosed, is one of the most interesting phenomena that the surgeon can study. The separation of the dead bone, or its *exfoliation*, is precisely similar to the mode in which a slough in soft parts separates, the time required being the only difference. Inflammatory action is set up so as to form a true line of demarkation and of separation in the substance of the bone that is still living and that is immediately contiguous to that which has lost its vitality. In this way a groove is gradually deepened around the edge of the sequestrum, by the absorption, or rather the disintegration, of the earthy matter of the living bone, which is carried off by the pus formed in the course of this process. This process of exfoliation may often be beautifully seen in the separation of the outer table of the skull in cases of necrosis of that bone. When occurring between the shaft and articular ends of a long bone, the process is precisely similar, though the line of separation is not quite so regular.

When once the dead bone has been detached by the formation of this line of separation, nature adopts steps for its ultimate removal from the body, there being no evidence that it ever, under any circumstances, undergoes absorption. The ultimate expulsion of the loosened or exfoliated sequestrum is effected by the growth of the granulations below it pushing it off the surface, or out of the cavity in which it lies. When the necrosed bone is peripheral, it will be readily thrown off in this way, although it may for a time be

fixed and entangled by the mere pressure and extension of the granulations. When the sequestrum is invaginated within old or new bone, the process of elimination is necessarily very tardy, and may be difficult or even impossible without surgical aid.

When the whole of a shaft dies, the reproduction takes place from various sources, principally from the periosteum, and perhaps the medullary membrane, if that is left, which becomes thickened, vascular, and detached from the necrosed bone. That the periosteum takes the principal share in the reproduction is evident from the fact that where it is deficient or has been destroyed, apertures (cloacæ) are left in the case of new bone. Then, again, the soft tissues of the limb generally, if thick, as in the thigh, contribute to the formation of plastic matter, which gradually ossifies, and so tend to strengthen the new case; and, lastly, the articular ends of the old bone, still preserving their vitality, throw out sufficient osseous matter to consolidate themselves firmly to the new shaft that is formed. Thus it will be seen that the new bone is formed by the vascular and healthy tissues generally that surround the seat of disease; though in this reparative action the periosteum and medullary membrane take the chief share. In acute necrosis there is no time for reparative action to take place; but the periosteum will be found much thickened and vascular, separated from the dead bone, and occasionally lined with scales of new ossific matter—the first step toward the reproduction of a new shaft.

The new bone which is deposited on those parts of the surface of the shaft from which scales of the old osseous tissue have been separated, or that envelopes the sequestrum when the whole thickness of the shaft necroses, is at first rough, porous, and cancellated, and very vascular; after a time it gradually becomes more compact and harder, at the same time that it assimilates in bulk and shape to the bone, whose place it takes.

The new bone usually forms with a rapidity that keeps pace with the death and separation of the old bone. In acute cases of necrosis, in which amputation has been performed but a few weeks after the setting in of the disease, a thick layer of new bone will sometimes be found under the periosteum; but in some instances, when the whole of a shaft is necrosed, the new case is not completed, or has not become attached to the articular ends before these are separated from the shaft. In other cases again, though com-

plete, it has not sufficient strength to resist the contraction of the muscles of the limb. Under these circumstances, it may become shortened, bent, or spontaneously fractured, as happened in a case of necrosis of the thigh lately under the care of Mr. Erichsen in the hospital. In other instances, again, when the periosteum is deficient, new bone does not form, but, as the sequestrum separates, the limb becomes shortened, loose, deformed, and useless.

Treatment.—The indications to be accomplished are sufficiently simple, though the mode in which they have to be carried out often requires much patience and skill on the part of the surgeon.

The first point to be attended to is to remove any constitutional or local cause that has occasioned or keeps up the disease. Unless this be done, it is clear that the rest of the treatment must be ineffectual; thus, for instance, if the death of the bone appear to result from scrofula or syphilis, those conditions must be corrected. So, again, if it arise in the lower jaw, from the fumes of phosphorus, the patient must necessarily be removed from their influence; or, if it be threatened in consequence of denudation of bone, the best mode of prevention will be to lay down flaps of integument, and so cover the exposed surface.

After the cause has in this way been removed or counteracted, the physical separation of the sequestrum should be left, as much as possible, to the unaided efforts of nature. The less the surgeon interferes with the reparative process, the better; for, as has been justly observed by Wedemeyer, the boundaries of the necrosis are only known to nature, and the surgeon will most probably either not reach, or pass altogether beyond them. Here much patience will be required for many weeks or months, and the utmost that the surgeon can do is to attend to the state of the patient's health, treating him carefully upon the general principles already laid down, removing inflammatory mischief by appropriate means, opening abscesses as they form in the limb, and, at a later period, supporting the patient's strength by good diet and hygienic treatment, calculated to bear him up against the depressing and wasting influence of continued suppuration, and of the irritation induced by the disease.

After separation of the sequestrum, the surgeon must adopt measures for its extraction. If the necrosis is peripheral, all that is necessary is to make an incision down to it through the soft parts, and to remove it with a pair of forceps, or tilt it off the bed of

granulations on which it is lying by introducing the end of an elevator beneath its edge.

When the necrosis is central, the sequestrum being imbedded in the new case, or covered in by old bone, the operative procedures for its removal are of a more complicated character. In cutting down upon the bone, the surgeon must be guided by the direction and course of the fistulous tracks that lead to the principal apertures in the new case, the incisions being carried in the axis of the limb, and carefully directed away from large blood-vessels and nerves. In many instances, however, the hemorrhage is somewhat abundant, in consequence of the injected state of the tissues furnishing a copious supply of blood, and their rigid condition preventing retraction of the vessels; this, however, may be arrested by the pressure of an assistant's fingers, and will soon gradually cease of itself. The bone having been freely exposed, it will sometimes be found that the cloacæ are of sufficient size to admit of the ready retraction of the sequestrum. But in the majority of cases this can not be done at once, and the apertures must be enlarged, either with the gouge or trephine, according to the density of the new case and the amount of room required. Occasionally, when two cloacæ are close to one another, the intervening bridge of bone may very conveniently be removed by means of cutting-pliers and saws of different shapes, thus giving increased space for the extraction of the sequestrum.

Care, however, should be taken not to remove more of the new case than is absolutely necessary, as the aperture so made in it will not be filled up again by osseous matter, but will be closed by fibrous tissue, and thus the ultimate soundness of the limb might be endangered. For the extraction of the sequestrum the most convenient instrument is a pair of strong necrosis-forceps, well roughened at their extremity, and straight or bent, as the case may require. Occasionally the sequestrum is so shaped and placed that it can not be seized with this instrument; under these circumstances, it is necessary to drive a screw-probe firmly into it. If the sequestrum is too large to be removed entire by this process, it may perhaps best be extracted piecemeal, having been previously divided by passing the points of a narrow but strong cutting-pliers into the interior of the bone. After removal of the sequestra, a smooth, hollow cavity will be left in the new case, from the bottom and sides

of which blood usually wells up freely, issuing abundantly from the vascular bone and from the granulating membrane lining its interior. Should this hemorrhage be at all troublesome, pressure will always sufficiently arrest it. Lint saturated with *calendula* or *symphytum* lotion must then be lightly introduced into the bottom of the wound and the part elevated. A good deal of inflammation is frequently set up after these operations, but that must be combated on the general principles already spoken of. If the sequestrum is a long one, and involves the greater part of the shaft of the bone, it may happen that the new case has not sufficient strength to maintain the limb in its proper length and shape, and that it will bend or break under the action of the forces and weight to which it is subjected. In order to prevent this accident, it will be necessary to put it up in light splints, or in a starch bandage. After removal of the dead bone, the fistula will speedily close, and the limb eventually regain its normal shape and size.

If the necrosed bone is so situated that it can not be removed, occupying too great an extent and continuing to be firmly fixed, and if, at the same time, the patient's health has been worn down by constant discharge, and symptoms of hectic come on; or, if the limb has generally been greatly disorganized by the morbid processes going on in it, amputation must be had recourse to as a last resource. It is especially in the lower third of the femur that these severe forms of necrosis occur, necessitating amputation of the limb. As an idiopathic disease, necrosis of the tibia is rarely met with requiring this operation; but when it is the result of bad compound fractures, or of other serious injuries, the removal of the limb may become necessary. In acute necrosis, however, of the lower end of the thigh or of the tibia, involving contiguous joints, and attended by extensive abscess of the limbs, amputation is imperative.

Amputation may also be required in necrosis for hemorrhage from sinuses and abscesses, the bleeding being either the result of general oozing from their walls, or arising from laceration of a large arterial trunk by the point of a ragged sequestrum. In other cases, again, removal of the limb may be rendered necessary by the implication and suppuration of a neighboring joint.

Resection of the whole of a necrosed bone may in some cases be advantageously performed; thus, in the case of necrosis of the ungual phalanx occurring from whitlow, where, by the removal of the

dead bone, the end of the finger may be preserved; so also in necrosis of some of the metatarsal and tarsal bones, resection may be advantageously practiced. When the ilium and pelvic bones are affected, it is seldom that any operative measures can be had recourse to with advantage. In some cases, however, if the disease be limited to a portion of the crest of the ilium, or to the tuber ischii, the dead bone may be removed. In these instances, however, it not uncommonly happens that disease of a similar kind exists elsewhere, about the sacrum or spine, that will eventually destroy the patient. In a case in which a portion of the crista ilii was removed for necrosis, apparently confined to that bone, it was found, on the death of the patient by erysipelas, some weeks afterward, that the lumbar vertebræ were also diseased.

Necrosis of the flat bones, such as the *sternum*, *scapula*, and *bones of the pelvis*, is an excessively tedious process, there being but very little tendency to the formation of the line of separation, and the detachment of the sequestrum, which will continue bare, rough, and adherent, for many years. Should it be so situated that it can be removed, it must be excised, even though not detached; but, unfortunately, in the pelvis it often happens that the necrosed portion is so deeply placed that it can not be safely excised: here we must leave the patient to the chance of the bone being at length so loosened as to admit of extraction.

Necrosis of the *cranial bones* occurs as the result of injury, of scrofula, or syphilis. In this form of disease there is the special danger of inflammatory action extending to the brain and its membranes. When attacking the vault of the skull, the necrosis is usually the result of syphilis, is often confined to the outer table, which may exfoliate in large plates, and is less liable than in some other situations to give rise to cerebral disease. When affecting the lower part of the frontal bone, the outer wall of the frontal sinus, or the supra-orbital ridge, the disease is generally strumous, and the process of separation is extremely slow; and it will usually be necessary for the surgeon to remove, by means of the trephine, gouge, or cutting-pliers, the attached but rough and dead bone. When the petrous portion of the temporal bone is the seat of necrosis, death will usually result from encephalitis. When the mastoid process is attacked, the sequestrum will often separate, and may be removed.

Necrosis may affect the alveolar process, the body, or the ramus of the lower jaw. Separation having taken place, in these cases the dead bone may usually be extracted through the mouth without the necessity of incising the integuments covering it; but, when very extensive, it may require to be removed by external incision.

The *patella* is rarely necrosed. One instance of primary necrosis of this bone leading to disorganization of the knee-joint, and necessitating amputation, occurred in my army practice.

When the *ribs* are necrosed, abscesses and sinuses will often form to a considerable extent on the side of the chest. These must be laid open and the diseased portion of bone scraped away with a gouge. In doing this, care must of course be taken that the adjacent intercostal space be not punctured by an unfortunate slip of the instrument, an accident that is best avoided by protecting the gouge well with the finger.

Treatment.—The constitutional treatment of necrosis is best effected by the use of the following remedies: *assafœtida*, *arnica*, *aurum*, *carbo veg.*, *merc.*, *nitric acid*, *phosph. acid*, *sepia*, *silicea*, *sulphur*, and *symphytum*.

If the disease arise from syphilis, scrofula, or mercurial poisoning, the remedies must be selected with the view of controlling both the constitutional taint and the local disease; and oftentimes the removal of the constitutional vice will be of itself sufficient to cure the local affection. If the disease has been caused by mechanical violence, *arnica* internally and externally will be found an efficacious remedy. If necrosis of the bones succeed disease of the periosteum, *ruta* and *symphytum* will be found of great service.

Assafœtida, either alone or in alternation with *nitric acid*, has cured many cases of necrosis, especially when situated in the shaft of the tibia or femur.

Carbo veg. has been highly recommended in necrosis of the leg, with a fetid discharge accompanying. Dr. Hornby, Vol. II, page 119, Transactions New York State Homœopathic Medical Society, reports an interesting case of necrosis cured by the internal use of *mercurius*, 6, *carbo veg.*, 15, *phosphorus*, 3, and *arnica* lotion externally.

Calcaria carb. has also been used with much success in the case of a youth attacked with necrosis, followed by separation and discharge of the diseased bone.

Silicea, in necrosis of the phalanges in a female of sixty-two years, who had employed various expedients, but in vain, was used with the happiest effect—the pains attending the disease disappearing in eight days, the sequestrum discharged, and a cure followed. Another case is reported, as the result of mechanical violence, in which the arm was severely injured and all motion in the limb lost. Two years subsequently, several fistulous openings were formed, through which fragments of bone frequently were discharged. *Arnica* relieved the pain; *silicea*, *calcareo*, and *sulphur*, effected a cure. A remaining stiffness of the joint was removed by *colocynth*.

In the treatment of this and kindred diseases, the most beneficial effects have resulted from the use of the *higher* potencies; cases have been reported cured by the 1000th potency, and even higher. The lower potencies have not seemed, in the hands of the author, to be productive of such good results as have almost uniformly followed the employment of the higher attenuations.

Regimen.—Besides the medicinal treatment for the improvement of assimilation, gravity and the essence of meat, the white of an egg mixed with milk and cream; dry, bracing air; a horizontal or half-lying position, in which suitable active and passive movements of the head and limbs, and subsequently the muscles of the trunk, are used, and a good hygienic regimen, not only arrest curvatures and deformities when beginning, but are also very beneficial when the complaint is advanced.

A case came under my treatment about a year ago, wherein the spinal curvature was but the concomitant symptom of an uterine affection. After the cure of the uterine derangement by suitable remedies, the patient recovered rapidly under *lycopod.* and *phosph.*, and in six months became perfectly well. Under simple hygienic means, first passive motion, and later active movements, with resistance either on the part of the patient or operator, Dr. Roth restored a case in the course of four or five months perfectly. (British Journal of Homœopathy, vol. xxiv, p. 647.)

CHAPTER II.

STRUCTURAL CHANGES IN BONE.

SECTION I.

RACHITIS, OR RICKETS.

Rickets is a disease of early life, usually being met with in scrofulous children, and never occurring after the age of puberty. In it the structure of the bones is changed, the earthy matter being deficient, and the organic material in excess, so that bone continues

Fig. 199.



Appearance presented by rickets in a child, the legs turned backward.

to be soft, flexible, and cartilaginous in structure at an age when its tissues ought to have undergone proper consolidation. It appears to be atrophied, and the cancellous structure to be expanded into cells of varying magnitude, which contain a brownish, serous fluid. In consequence of the change of structure and the loss of firmness in bones in this disease, considerable distortion of the body takes place. The head early appears large and expanded; indeed, Killian states that rickets always first appears in the head, the forehead being especially protuberant. According to Mr. Stanly, this arises not from enlargement of the cranial bones, but in consequence of the want of development of those of the face; the

head thus appearing large from its disproportion to the small face.

The shape of the limbs is much changed and distorted, in consequence of their yielding to the pressure of the superincumbent

weight (Fig. 199, on page 806), the pelvis becoming contracted, and the thighs and legs bent either forward or backward. The joints are usually swollen, the articular ends of the bones appearing enlarged. In early life the chest will be observed to be deformed in a peculiar manner, being narrowed above, where the upper ribs are contracted and pressed in, but expanded below, apparently from the weight of the abdominal viscera, which are often tumefied, and in these cases commonly drag on the lower ribs. As puberty advances, lateral curvature of the spine usually takes place. In rickety children there is a general delicacy of appearance, and often a strumous habit of body, though, according to Rokitsansky, they are not usually tuberculous; if they live, however, past the age of puberty, they may eventually become strong in frame.

Symptoms.—The symptoms of rachitis possess nothing of a definite character in the earlier stages of the disease, the approaches of which are stealthy and at times almost imperceptible. The child is observed first to be dull and listless; the digestive organs are deranged, and attended with flatulence and colicky pains. In a little while marked emaciation sets in, with all its attendant symptoms; the muscles become soft and flabby; abdomen distended and tympanitic; skin dry and sallow; the face looks pale and doughy; the urine is scanty, turbid, and lateritious, and the alvine evacuations are thin, watery, and fetid; dentition is retarded; the teeth often begin to decay as soon as they have protruded through the gums; the fontanels and sutures remain open, and the whole process of ossification is peculiarly slow and imperfect. As the disease advances, the *bones* grow more and more soft, and, being unable to sustain the weight of the body, become irregular and tortuous. The head seems disproportionally large to the size of the face, and is sunk down between the shoulders; the clavicles are bent; the spine is curved in various directions; the pelvic bones are bent inward; the ribs are flattened, and the chest presents a narrow and pigeon-shaped appearance. The bones of the extremities are shortened, bent, and twisted upon their axes, while their articular extremities are softened and expanded, appearing larger and more prominent than natural. If the child has begun to walk, he becomes more feeble on his legs, and trips, waddles, and falls, and soon is no longer able to walk.

Diagnosis.—The only disease that rachitis can be confounded with is *osteomalacia*, or softening of the bones. The following characteristics will enable the surgeon to distinguish between the two:

Differential Diagnosis:

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| 1. Rachitis is an affection of infancy and early childhood. | 1. Osteomalacia never occurs until after middle age. |
| 2. In rachitis, the softened condition of the bones is only temporary. | 2. In mollescence, the disease, once begun, continually progresses. |
| 3. In rachitis, the urine is little altered in quality or quantity. | 3. In osteomalacia, the urine is always loaded with a large quantity of earthy salts. |
| 4. In rickets, there is an actual arrest of development, in consequence of which the bones remain disproportionally short, thin, and dwarfish. | 4. In softening, the affected bones retain their normal shape, although they can be bent and twisted in any direction. |

Prognosis.—The prognosis of rickets is generally unfavorable, and few recover without permanent deformity. It is dangerous in proportion to the age of the patient, the progress of the disease, and the number of bones affected. Very young children are more apt to die than those more advanced in years, and when born of scrofulous parents, than those who contract the disease from accidental circumstances. The disease progresses very slowly at times, while at others it is exceedingly rapid; but generally under the most favorable circumstances several years elapse before complete recovery occurs.

Treatment.—In the treatment of this disease, great advantage is to be derived from a properly-regulated regimen, change of residence, and regularity of habits, with a view to the invigoration of the general system. The diet should be mild and nutritious, comprising an adequate amount of nourishment in the smallest possible space, so as not to oppress and derange the stomach. In infancy, the mother's milk, if considered unwholesome, should be discontinued, and that of a healthy, vigorous nurse substituted; or, in the absence of the female breast, the milk of the ass affords a most excellent substitute. If the patient's teeth are developed, a small amount of rare animal food, especially fat meats, given once or twice a day, with an allowance of bread and well-mashed potatoes, will be useful. The body should be bathed twice a day with salt-water;

and if the system is not too much reduced, cool or even cold bathing will be found highly invigorating. Frequent and well-timed exercise in the open air should be enforced daily, but not to the extent of fatigue. The clothing should be adapted to changes in the weather, in order to protect the body from extremes of heat and cold.

The remedies that have been found most beneficial in the treatment of this affection are: *Assafæt.*, *acid phosph.*, *calcareæ*, *dulcam.*, *hepar*, *ignat.*, *bry.*, *bell.*, *ipsecac*, *nux vom.*, *mez.*, *lyc.*, *staph.*, *sil.*, *sulphur*, *jodatus*, *ol. jecor.*, *kali hyd.*

In the *first* stages of the disease, when derangements of the digestive functions predominate, *bry.*, *ipsecac*, *merc.*, *nux*, *puls.*, and remedies of this character, will oftentimes produce a most favorable impression upon the disease.

Oleum jecoris is highly praised by Hartmann in the early stage. He says: "According to my experience, it is in this preliminary stage that cod-liver oil will do the most good, and actually effect a cure and remove the danger of relapse, provided a proper dietetic and hygienic regimen is observed." The oil may be used internally, and at the same time rubbed on the abdomen. If no improvement should set in after using the oil for a fortnight, or if the child should evince an insurmountable repugnance to taking the oil, some other medicine will have to be used.

Belladonna, if the abdomen is hard and distended, attended with fœtor of the breath, with sunken, pale, bloated face, alternate flushes of heat and redness, fretfulness, startings during sleep, will affect good results, although some other remedy will be demanded to complete the cure.

Acid phosph. has a more specific relation to diseases of the bony structure, especially after the preliminary use of *bell.*; it is indicated in a bruised feeling in the limbs, weariness, emaciation, sickly look, sunken eyes, startings in the sleep, the frequent appearance of fine rash, constant ill-humor, gastric derangement, with accompanying diarrhœa.

Mezereum, *lycopodium*, and *calcareæ c.*, exercise a marked controlling influence over the disease, especially after the subsidence of the derangements in the first stage.

Hepar, *silicea*, and *sulphur*, have been employed with much advantage, and by their use the general health has been restored and the disease arrested in a short space of time.

Ruta graveolens is recommended by Hartmann as an excellent remedy for rickets; and he employed, "with considerable success, *brucea anti-dysenterica*, in those cases where the feet turned outward and the children walked on the inner ankles."

Staphisagria is advised as having decided curative powers in rachitis, affecting with equal intensity the bones and soft parts, the blood and nerves. A principal indication for the remedy is when the front teeth turn black and break off in fragments. The higher attenuations are recommended, and the dose not to be repeated too often.

Pinus sylvestris.—This remedy, according to Dr. Patzack, has been employed "with advantage, both internally and externally, with marked benefit." It is recommended particularly when children are slow to acquire the use of their legs, owing to an inherent constitutional weakness of the bones.

Pulsatilla, *calcareea*, and *silicea*, are the best remedies for the tardy closure of the fontanel, as concomitant of this disease.

Mercurius sol., *colchicum*, and *sulphur*, are regarded by Teste as the fundamental remedies for rachitis. "Their efficacy," he says, "is notorious, and with their aid I do not regard rachitis as incurable."

When the malady is connected with mercurial disease, the proper remedies are *aurum*, *hepar sulph.*, *calcareea carb.*, *iodine*, *kali hydroid.*, *nitric acid*, *phytolacca*, *stillingia*.

Scrofulous complications will demand *calc. carb.*, *phosphorus*, *silicea*, *sulphur*, and *ol. jecor.*, and the salts of lime and phosphorus.

Lycopodium.—Dr. Marweg reports a case of rachitis cured by the use of this drug, in which the patient was scrofulous in the highest degree; face covered with freckles; bones softened and discharging a saffron-yellow water; everything tasting salty. *Lyc.*, 30, so far cured the case that in four weeks he was able to take exercise; and *graphites*, 30, restored him to perfect health.

SECTION II.

MOLLITIES AND FRAGILITAS OSSIUM (OSTEOMALACIA).

This very rare but most destructive and dangerous disease of the bones, characterized by softening and fragility of the osseous structure, is occasionally met with. This affection has of late been

studied with much attention by Curling, Solly, Stanly, and MacIntyre, and it is principally from the labors of these persons that we are acquainted with its true pathology. In this disease the bones are bent, their epiphyses swollen, and their shafts broken in various parts of the body. Occasionally, though very rarely, only one is fractured; but in other cases, as in Tyrrell's, there may be as many as twenty-two fractures, or, as in Arnott's, thirty-one. These fractures are unattended by any attempt at the formation of callus. The body becomes singularly and distressingly distorted. On examining the bones after death, they will be found to be light, soft, and somewhat gritty; bending, and at the same time readily snapping across. Occasionally they are expanded and thickened. This happens especially with the skull, which becomes often considerably increased in substance. On cutting the bones, which are soft, and yield something like cartilage, the knife usually encounters a kind of gritty sensation. On making a section of the bones, they appear of a deep reddish-brown or maroon color, and will be seen to contain cavities of various sizes, small or large, but always of a circular or oval shape, and generally filled with an oily, red, and grumous fluid, though sometimes they contain clear serum. On examining this red grumous matter under the microscope, Solly remarks that, as it shows a cell development, it is probably an adventitious morbid product, and not simply fatty matter altered by the effusion of blood into it; and Dalrymple has shown that this material is composed of granular matter, nucleated cells, and a few caudate corpuscles. He therefore believes it to be a disease essentially malignant in its nature, but differing from other malignant affections; for, "instead of progressively reproducing and developing themselves without limitation, the new and morbid formations which replace the original and sound structure seem to have been, at an early age of their existence, removed by absorption and carried out of the system." (MacIntyre.) The bone itself has been found by Solly, on microscopical examination, to have its laminated structure absorbed, the osseous corpuscles diminished in number, and the Haversian canals enormously distended.

In chemical composition, the diseased bone has been found by Dr. Leeson to be composed of 18.75 animal matter, 29.17 phosphato and carbonate of lime, and 52.08 of water, in every hundred parts.

The causes of the complaint seem altogether unknown; it would

appear that in many cases it is connected with a rheumatic tendency, as in every case recorded the affection has been preceded or accompanied by severe pains, or distinct rheumatic attacks. It most

Fig. 216.



Madame Supiot; in a posture quite practicable in the advanced stage of the disease.

commonly, though not invariably, occurs in females, a fact pointed out by Killian, and exclusively attacks adults, commencing even at very advanced ages. See Fig. 216.

One of the most important points connected with this affection is the condition of the urine in it. In all cases that have been recorded, this excretion has been seen to contain large quantities of earthy matter. Solly pointed out that this is the phosphate of lime which has been absorbed from the bone and thrown out by the kidneys in the urine; sometimes the elimination of these matters is so abundant that it forms, as in one of these cases which he relates, a solid calculus clogging up the interior of the kidney. In Dr. MacIntyre's case, the earthy matters of the bone appear to have been, in the first instance, absorbed and carried off from the kidneys by the urine, but afterward an animal matter of a peculiar and apparently previously undescribed character, was discharged in great abundance. He says that on adding nitric acid to the urine a slight yellowish opacity was the first announcement of a change going on in the mixture; this gradually deepened in tint, with increasing consistency of the fluid, till the whole congealed into a bright and somewhat resplendent mass, presenting very much the appearance of a heap of nitrate of urea scales, blocking up the tube. It further resembled that substance in liquefying on the application of heat, and again concreting on cooling; but no crystalline arrangement could be perceived, the sparkling appearance being evidently due to numerous air-bubbles entangled in the mass. Perfect redissolution took place when the tube was held for a few minutes in the flame of a spirit-lamp or plunged into hot water at 160° or 170° , the ordinary coagulating point of albumen; and the fluidity thus acquired persisted under ebullition, however prolonged." (Med.-Chirurg. Trans., vol. xxxiii, p. 29.)

Symptoms.—The symptoms of this disease are, in the early stages, of an extremely obscure and insidious character. The patient complains, in the first instance, of pains of a wandering character about the limbs and trunk; these assume usually a rheumatic character, though they have been observed to be of a much more severe, persistent, and intractable nature than in any form of that affection. The patient becomes debilitated, unfitted for exertion, and emaciates. Spontaneous fracture now occurs in some bones under the influence of the most trivial causes; others become bent, and the body consequently becomes greatly mis-shapen and distorted, in the most wonderful manner. The urine will be observed to present some of the abnormal characters above described, and death eventually results from general exhaustion.

Diagnosis.—The diagnosis of this affection from rheumatism has to be made in the early stages. This is not easy, and, indeed, is at first impossible; but after a time, when the peculiar phosphatic condition of the urine and the fragility or distortions of the osseous system manifest themselves, the true nature of the affection reveals itself. From rickets the diagnosis may usually be pretty readily made, by observing that, while rickets is a disease of childhood, osteomalacia is an affection peculiar to adult or advanced life. The occurrence of severe pains, and the greater amount of distortion, with tendency to spontaneous fracture, which is observed in this disease, is never noticed in rickety children.

Treatment.—In the treatment of this affection, as already advised in the treatment of the preceding diseases of the bones, attention must be given to the constitutional defects existing at the time, as well as the restoration of the vital forces by the means already recommended. A generous diet should be permitted, and all muscular exertion prohibited; in fact, a well-regulated hygienic and dietetic regimen should be observed.

The remedies best adapted to control the morbid process going on in the bony structure are, *ars.*, *assaf.*, *calc. c.*, *calc. phosph.*, *graph.*, *iodine*, *merc. sol.*, *phosph. acid*, *nitric acid*, *mezerium*, *ruta*, *kali hyd.*, *silicea*, *staph.*, *sulphur*.

Mercurius, *kali hyd.*, and *nit. ac.*, are recommended in those cases in which a syphilitic dyscrasia exists in the system.

Phosphoric acid, *iodine*, and *ruta grav.*, are also highly recommended in the treatment of this disease.

Staphisagria proved of incalculable benefit, in the hands of the author, in a case of this character.

Pinus sylvestris, from its action on the bones as well as soft structures, should possess decided curative action in this disease.

Mr. Cooper, in speaking of the treatment of this affection, says: "I have on two or three occasions had reason to believe that great benefit was derived from giving *bone* powdered and mixed with bread, and at the same time draughts containing phosphoric acid, which converts phosphate of lime into a biphosphate, a more soluble salt than the phosphate, and probably much more readily assimilated. The result of this treatment was certainly such as would warrant the just expectation of facilitating the nutrition of bone." Acting upon this principle, it has been abundantly proven that the advantages to be derived by applying phosphoric acid to exfoliating bone, to produce its rapid removal, are of the most beneficial character. In lieu of the process employed by Mr. Cooper, I have in two instances witnessed the most satisfactory results from the third trituration (decimal) of powdered bone administered in alternation with phosphoric acid and given until a curative effect was observed.

Superphosphate of iron is another remedy highly praised, and which is said to produce very satisfactory results. To produce the desired effect, it should be given in the medium potencies, and continued until an impression is made upon the diseased organism.

During the treatment by these remedies, it may be necessary to interpolate other medicines as they may be called for in any incidental derangement that may arise.

Generally, all remedies, to be of value, should be given in the higher attenuations, or little benefit will result from their use. From a considerable experience in the treatment of this disease, I am satisfied that the more highly dynamized remedies produce the most certainly curative and lasting effects.

In all cases of osteomalacia, those articles of food should be recommended which contain larger proportions of lime, phosphorus, and other principal elements that enter into the normal constituents of bone. When the affection occurs in children, the use of the unbolted flour of the cereals—wheat, rye, oats, and corn—is of the greatest advantage.

CHAPTER III.

BONY GROWTHS, OR TUMORS.

The morbid growths developed in bones present the same general characteristics as those described in connection with the soft parts, and may be classified, primarily, as **Innocent** and **Malignant**; the former including exostosis, aneurism, cysts, hydatids, and fibroplastic tumors; the latter, cancerous tumors — encephaloid, colloid, scirrhus, and melanosis.

SECTION I.

INNOCENT FORMATIONS.

§ 1.—Exostoses, or Bony Tumors.

By exostosis is meant a bony growth springing from the compact or cancellated tissue of a bone, and possessing the general characteristics of structure peculiar to normal osseous tissue.

Varieties.—There are several varieties of this tumor, the most common of which is the *eburnated*, or ivory-like, Fig. 217, being hard, compact, and white; the *laminated*, so named from the circumstance of its being formed by successive layers; and the *spongy*, which consists principally of cancellated tissue. Exostoses are also designated as *circumscribed*, *tuberculated*, and *spinous*, according to their peculiar shape.

Fig. 217.



Several ivory exostoses, clustered on the os frontis.

Seat.—The favorite seat of exostosis is the cranium, the femur, tibia, phalanx of the great toe, lower jaw, and clavicle. The tuberculated variety is most frequently found in connection with

the flat bones, and may be developed upon either surface, while the spinous and circumscribed generally affect the long bones.

In **volume** they are subject to great diversity, in some instances reaching the size of an adult head, and occasioning the most serious deformity; while in other cases they do not exceed the volume of a grain of wheat.

When occurring near joints, they not unfrequently bridge over the articulation, producing ankylosis.

Causes.—The immediate cause of this disease is generally very obscure; though in general it may be said to arise from “any cause which will induce increased action in the bone or its investing membrane.” Syphilis, rheumatism, gout, and external injury, have been assigned as efficient causes, and undoubtedly exert a marked influence, notwithstanding the fact that it is usually impossible to trace a satisfactory relationship.

Progress.—This affection is generally very slow in its development, the tumor, after reaching a certain size, frequently remaining for a long time without material change or serious inconvenience. In syphilitic or rheumatic exostosis, however, the tumor is occasionally seen to grow rapidly, attended by severe pain, especially at night, with tenderness and swelling of the soft parts, and more or less constitutional disturbance. Such instances, however, are exceedingly rare.

The tumor may interfere with the function of adjacent parts, or become dangerous to life, during its progress, according to the position it occupies. Thus, an exostosis may press upon muscles, tendons, or blood-vessels, materially affecting the proper exercise of their function, and in extreme cases may produce their complete absorption. In other cases, serious difficulty may result to the pelvic viscera in consequence of a bony projection from the internal surface of the os innominata, while it may also afford a dangerous obstacle to labor. Exostosis of a vertebra may occasion fatal pressure of the spinal cord; of the internal surface of the cranium, the brain; of a rib, the lungs.

Symptoms.—During the early stages of the disease the growth of the tumor is, with scarcely an exception, so slow as to be almost imperceptible. If seated upon the external surface of the bone, the tumor can be felt to be hard and immovable, occasioning little or no pain upon manipulation. As the disease progresses, the

tumor becoming developed to a considerable size, the symptoms consequent upon severe and continued pressure of the surrounding structures ensue, as heat, pain, redness, and swelling, with perhaps abscesses of the cellular tissue, ulceration of the integuments, and severe neuralgic pains occasioned by the compression of nervous filaments. In bony growths of the internal surface of the cranium (*exostosis*), epilepsy, general or local paralysis, may arise, together with other serious symptoms.

Treatment.—The treatment of *exostosis* must be guided in a great degree, at least in the early stage of the disease, by the nature of the exciting cause. When there is reason to believe that the disease has been occasioned by a deranged condition of the system, induced by the action of a syphilitic, mercurial, or gouty poison, the remedies adapted to those conditions will be demanded either alone or in alternation with the specifically-indicated medicine. I have occasionally succeeded in this way not only in arresting these morbid growths, but actually compelling their absorption.

For the internal remedies, our reliance must be chiefly on *assa-fatida*, *aurum*, *calcareæ*, *silicea*, *causticum*, *mezereum*, *phosphorus*, *mercurius*, and *sulphur*. Applications of the *tincture of iodine*, or friction with an ointment composed of *mercury* or *iodine*, are sometimes of value. The more recent the tumor, the more effectual such means are likely to prove.

Topical applications, in the early stages of the disease, are of considerable value in the treatment of these affections. *Arnica*, *calendula*, *ruta*, and *symphytum*, are more frequently called for than other remedies. If the disease arise from a contusion, bruise, or other mechanical violence, *arnica* is the sovereign remedy. If from a lacerated wound, *ruta* or *symphytum* is more appropriate. If from disease of the periosteum, as a result of destruction of that tissue by suppuration, *calendula* or *mezereum* should be selected. When the growth becomes *chronic*, much benefit may be derived by occasionally painting the part with *tincture of iodine*, or the application of a vesicant, and keeping up a discharge from the abraded surface for several days. In the syphilitic form of *exostosis*, the second or third trituration of *merc. jodatus* will often succeed when all other remedies have failed.

When the tumor has attained such a size as to occasion inconvenience or deformity, the best practice is to remove it; and if the

removal is thoroughly done, there is no danger of its return. If the whole growth is not excised, it may return; hence it has been advised that if the tumor be situated upon the cranium where its base can not be extirpated, *nitric acid* or the *potassa fusa* should be applied to the portion remaining, so as to produce perfect exfoliation of the deposit.

The incisions through the integument ought to be sufficiently free to enable the operator to work to advantage, taking care, on the other hand, to avoid any important structures the division of which might lead to impairment of the parts: If the skin is diseased, or much attenuated, the affected portion should be removed with the bony growth. The removal may be best effected with the trephine, Hey's or chain saw, the gouge, chisel, or cutting-forceps. But when situated near large joints, or springing from the cervical vertebræ, or in the neighborhood of the orbit, they should not be interfered with; or if so, their removal can be effected only by the utmost caution and care. In whatever manner the ablation is accomplished, it must always be remembered that the bone should be smoothed by the raspatory; otherwise the rough surface will seriously militate against the healing process. The hemorrhage attending the operation is slight. The edges of the wound should be approximated by adhesive straps, and the parts kept constantly moistened with a lotion of either *calendula* or *ruta*.

There is a peculiar kind of bony growth springing from the upper surface of the last phalanx of the great toe, pushing up the nail and giving rise to much pain and inconvenience. It may be removed by exposing its base and cutting it off with a pair of sharp bone-forceps, without seriously interfering with the bone of the great toe.

§ 2.—Enchondromata, or Cartilaginous Tumors.

This variety of tumor, already described under the head of Tumors, is more frequently found in connection with bone than in any other structures of the body, and may be developed in the cancellated tissue or upon the surface of bones. Any portion of the osseous system may become affected, though the bones of the fingers and toes, humerus, and inferior maxilla, are the most obnoxious to it. It is generally slow in its progress, occasions little inconvenience except from its size, is globular in form, firm, dense,

and elastic, and of a white or grayish color. In some instances it becomes red, dense, and interspersed with osseous matter, which circumstance induced many surgical authorities to designate it as *osteo-sarcoma*.

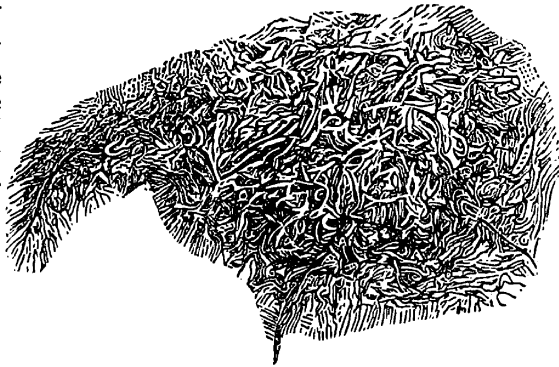
Treatment.—The treatment of this disease is pointed out under the head of *Enchondroma*, which is included in the class of tumors or morbid growths already treated of on page 587, to which the student is referred for observations more *in extenso*.

§ 3.—Aneurism in Bone.

Pulsating tumors of bone, or osteo-aneurisms, though of unfrequent occurrence, are occasionally developed in bone, and are of *three* varieties: *first*, soft cancer, the circulation through which may be so energetic as to produce pulsation which yields a whirring sound, similar to

Fig. 218.

that heard in aneurism; *second*, tumors formed by the development of *erectile tissue* in the substance of a bone (Fig. 218); *third*, tumors depending on enlargement of the osseous arteries.



Aneurism by anastomosis of one of the parietal bones.

This last variety, to which the name *osteo-aneurism* is given, is generally situated in the extremity of one of the long bones, and the head of the tibia is the most frequent seat of the disease. The patient complains of a sudden pain in the part, which is soon followed by painful swellings, with a fullness and tenseness of the veins of the leg. In a short time the whole limb becomes dark-red and painful, the tumor possessing a pulsatory movement. It is generally moderately firm to the touch, and upon pressure gives a slight crackling sensation owing to the thin shell of bone which covers it. The structure and appearance of these tumors present a spongy-like tissue, containing convoluted vessels and cells, the latter being filled with clots

of blood in concentric layers. The bone during this process becomes expanded, thinned, and absorbed. This disease has also been observed in the humerus, radius, femur, and ilium. As these tumors are usually immovable, little difficulty will be ordinarily experienced in detecting their true character. Cancer of bone, especially of the encephaloid variety, is remarkably similar to aneurism in its earlier stages, and may be confounded with this disease. It may be distinguished from this by the following

Differential Diagnosis:

Osteo-aneurism attacks the articular ends of bones, and rarely occurs in more than one place in the same individual at the same time.

Osteo-aneurism grows slowly, and does not affect the skin.

In compressing the main artery of osteo-aneurism with the hand, pulsation ceases and the tumor subsides.

No cachexy of system exists with osteo-aneurism.

Osteo-cancer is met with in any portion of bone, and may exist in several places at the same time.

Osteo-cancer grows rapidly, and involves the skin.

Pressure in osteo-cancer has no effect whatever upon the morbid growth.

Osteo-cancer shows the peculiar cancer cachexy.

Treatment.—Incision into a pulsating tumor of bone, or any attempt to remove it without its osseous connections, is contrary to the rules of good surgery, the hemorrhage being alarming and dangerous. Resection has been attempted also, but without success. Liston, in a tumor of this kind growing from the scapula, which he called “an ossified aneurismal tumor of the sub-scapular artery,” excised the greater portion of the bone from which it sprang; but fungous growths reappeared in the wound, by which the patient was at last exhausted. When the disease has proceeded to such an extent as to produce extensive alteration in and destruction of the tissue of the bone affected, and the remedies given produce no good effect, amputation is the only resource left to the surgeon. This operation is also called for in those cases in which the disease returns after other means have been practiced, such as the ligature of the artery. In these cases, if the disease partakes at all of the encephaloid character, the limb must be removed at a point above the affected bone.

The result of ligature of the main artery leading to the tumor depends greatly upon the nature of the growth. When it is partly

composed of encephaloid or other solid tissue, but little good can result from this proceeding, the tumor continuing to increase by an inherent growth, that will continue so long as the vitality of the limb is maintained. And we accordingly find that in all such cases in which this operation has been practiced, the progress of the tumor has either not been retarded, or if the pulsations have been stopped and its size lessened for a time, the activity of the symptoms has speedily returned and amputation been rendered necessary. When, however, the tumor has partaken more of the characters of true osteo-aneurism, then a more favorable result has followed the ligature of the main artery of the limb. In a case of this kind seated in the radius, in which Roux ligatured the brachial artery, a complete cure resulted. The same also occurred to Lallemand; and in a patient of Dupuytren there was no return of the disease for six years, when it recurred, and amputation became necessary. These results are sufficiently satisfactory to justify the surgeon in having recourse to the ligature, or perhaps the compression of the main artery of the limb, in those cases in which the tumor could be ascertained not to partake of the nature of encephaloid.

The medical treatment of aneurism in the bony structure, and the records of cases treated, are so exceedingly limited, and the results so obscure, that it is impossible to give any precise directions in regard to the remedies to be employed in this disease. *Aconite*, *ars.*, *cactus gran.*, *carbo. veg.*, *erigeron*, *ham.*, *thuya*, *asculus hip.*, *lach.*, *sepia*, *lyc.*, *mezer.*, *rhus*, *staph.*, and *sulphur*, are among the important remedies whose pathogeneses entitle them to consideration in the treatment of this affection.

§ 4.—Serous Cysts—Cystoma.

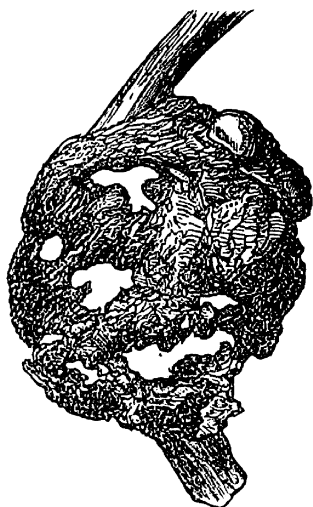
Serous Cysts of the bones differ in no essential particular from those developed in the soft parts, being composed of a thin, polished membrane containing a peculiar fluid matter, which is sometimes thin and serous; sometimes dark-colored, viscid, or glutinous; in other instances sero-purulent; while old cysts not infrequently are found to contain a solid matter of a fibrous or fibro-cartilaginous nature.

They are most commonly met with in young adults and middle-aged persons, being rarely observed in children or in subjects far

advanced in life. The lower jaw, tibia, and femur, are the bones principally affected, the disease first exhibiting itself in the areolar tissue. It presents two distinct forms, the *unilocular* and *multilocular*. The latter form is exceedingly uncommon.

The *unilocular*, or solid variety, possesses a fibro or fibro-cartilaginous character, attaining considerable size, and occupies by

Fig. 220.



Cystic tumor of lower end of femur.

preference the maxillaries and articular extremities of the tibia, femur, and humerus. The *multilocular*, or semi-fluid, grow much larger than the last, and are oftentimes met with of the size of a cocoanut or a foetal head. They contain a thin, sanguinolent, viscid, or dark-colored fluid, intermingled with masses of fibrous matter, appearing as if it proceeded from the central softening of these large growths. Their walls are composed of expanded bone, not uniformly thinned, but thickened and nodulated at some parts, while they are perforated at others; Fig. 220.

Diagnosis.—These cystic tumors rarely occur in children, but are seen principally during adult life. They constitute smooth, oval, or round growths, increasing gradually and persistently, with little or no pain or discoloration of the skin, the veins skirting their surface being usually blue, enlarged, and tortuous. When a certain size has been reached, producing expansion of the bone into a shell or thin lamina, and before perforation takes place, pressure on the tumor produces a peculiar, *crackling*, or *rustling* sound, similar to that made by the pressing together of a broken eggshell in the clenched hand, or the cracking of tin-foil. Elasticity, or even semi-fluctuation, will also be felt in addition to the sounds described. As the osseous sac becomes still more expanded, or is partially or wholly absorbed, this fluctuation becomes more distinctly felt.

Treatment.—The remedies recommended for exostosis may be employed, sometimes with benefit and at other times with no appreciable advantage. In such cases it is necessary to resort either to

resection or amputation, the method selected having especial reference to the situation of the tumor and its character. When the growth is solid, the best means of getting rid of the disease is by removal of the whole mass by resection, if situated in the jaws, or by amputation if it occupies the articulating surfaces of the limbs. If the contents are fluid or semi-fluid, and have attained a large size, they must be treated in the same way as the solid growths. But if they are small or of moderate size, and not affecting materially the integrity of the bone, the diseased portion or one side of the wall may be removed by excision or the trephine, taking care to fill the cavity with lint wet with *calendula* or *symplytum* lotion; granulation takes place, and the walls of the cavity fill up with fresh ossific matter. This plan has proved successful in some of these tumors affecting the lower jaw. Evacuation by opening and counter-opening, with application of pressure to effect contraction and solidification, has also been productive of good results. These tumors are so rare that M. Roux has only seen a few well-marked cases during his long surgical career.

§ 5.—Hydatic Tumors in Bone.

Hydatids are occasionally developed in the spongy structure of bone, and are liable to occasion the most serious consequences. Thus, several instances are recorded in which profuse suppuration and ultimate destruction of the knee-joint resulted from the bursting of acephalocysts into the articular cavity. In other instances, they have been known to produce severe constitutional disturbance, with intense pain and hectic fever.

They are found almost exclusively in the long and flat bones, especially in the tibia; are seldom met with in children; and are exceedingly slow in their development. In size they vary from a grain of wheat to that of a walnut; are rounded or irregularly flattened in shape, inclosed in a thin, whitish membrane (parent-cyst), containing a limpid fluid of an albuminous character, in which the animal is seen to float. Sex does not appear to exercise any particular influence upon the development of hydatids in bones, as they have been seen with nearly the same frequency in men and women. In a single instance they have been known to occur in a child three years of age; and Borchard has related a case where they existed in several situations in the same individual.

Symptoms.—The symptoms of hydatid disease are extremely obscure, being mostly of a negative character. There is generally an absence of pain and swelling, little or no discoloration of the integuments, and a want of constitutional disturbance. The tumor, which is hard and firm at first, eventually assumes a soft, elastic feel, emitting a crackling noise upon pressure. These symptoms, however, are common to other formations, and can be relied upon only as presumptive evidence. If the tumor be deep-seated, a gradual wasting of the superimposed tissues takes place, and portions of the fibrous membranes are actually absorbed. During this time, the functions of the surrounding parts are impeded; pain and tenderness set in, and the affected bone sometimes yields under the most trifling accident, refusing afterward to unite or undergo consolidation only after a long time and much trouble.

The only positive and reliable source of information is the exploring needle, though this is only available, unfortunately, when the disease has existed for a long time, the morbid growth having acquired a great bulk, and almost on the verge of bursting.

Treatment.—The only reliable remedy at present known in the treatment of this affection is extirpation; and the earlier this is performed the better, for then there is no structural lesion of the bone involving the necessity of either resection or amputation. As soon as the diagnosis confirms the existence of hydatids in the bony structure, excision of the tumor should be performed by means of the saw, cutting-forceps, chisel, and mallet, or trephine, according to the circumstances of the case. Having scooped out its contents, the lining membrane of the osseous shell should be either peeled off or painted with a strong solution of the *tincture of iodine*, for the purpose not only of destroying its secreting surface, but also of killing any remnants of hydatids that may have been overlooked during the operation. The cavity should then be filled with lint saturated in a solution of either *calendula* or *symphytum*, and the flaps approximated and held in position by a few strips of adhesive plaster. The cavity will gradually close with granulations, and a cure be effected by this process.

When the case is one of an aggravated nature, involving the entire circumference of the bone, or when the hydatids open into a joint, resection or amputation affords the only hope of recovery.

Resection may be performed when the disease is limited in its

extent. *Amputation* is necessary when the bone is irremediably destroyed, broken, or unwilling to unite, or when constitutional disturbance is so great as to threaten life.

So far as the medical treatment of this affection is concerned, there are no remedies at present known that exercise any really curative agency over the hydatid growth. Those which have been used, and proved in some respects beneficial, are *arnica*, *arsenic*, *bell.*, *calc.*, *hepar*, *merc.*, *phosph.*, *pod.*, *sil.*, *sulphur*.

§ 6.—Fibro-plastic Tumors.

Fibro-plastic or Myeloid tumors of bone usually consist of a firm, fleshy mass, their cut surface exhibiting a gray or greenish-white color, mottled with reddish, pink, or crimson spots. The arteries supplying it are generally dilated, while the tumor itself is often highly vascular. Spiculæ of bone are frequently found imbedded within their substance, together with cysts of various sizes, containing a variety of fluids, as serum, sanguinolent matter, or blood, more or less disintegrated.

The favorite seat of this growth is the lower jaw, the tibia and femur being attacked next in frequency.

These tumors are also slow in their development; have an elastic feel; are oval or lobulated; unattended by pain; and rarely if ever ulcerate.

Treatment.—The only remedy for this affection is either excision or amputation: *excision* when the tumor involves the jaws, and *amputation* when it is seated in the bones of the extremities. The operation will be performed on the same principles as recommended under the head of Hydatid Tumors in Bones. The remedies that have been productive of most benefit in the treatment are *acon.*, *ars.*, *assa.*, *bell.*, *calc. carb.*, *can.*, *dulc.*, *eupat.*, *graph.*, *lach.*, *lyc.*, *merc.*, *mezer.*, *nit. ac.*, *phosph.*, *ruta*, *sil.*, *staph.*, *sulphur*. The particular indications of each remedy will have to be carefully compared with the symptoms as presented by the disease, and given accordingly.

SECTION II.

MALIGNANT FORMATIONS.

‡ 1.—Encephaloid, or Osteo-Cephaloma.

This variety of cancerous formation, deriving its name from its resemblance in color and consistence to the medullary structure of the brain, is the most common form of malignant growth invading the osseous tissue. It generally originates in the spongy structure of the bone, but is occasionally found attached to the compact bony substance. Its favorite seat is the lower jaw and the long bones, though it may occur in any part of the skeleton. It is particularly liable to recur after extirpation, the subsequent deposit generally being found in the lungs. In form the tumor is globular and lobulated, is elastic, and not unfrequently semi-fluctuating. Internally, it often "contains small cavities filled with clotted blood, dirty-looking serum, or soft, gelatinous, oily, sebaceous, or melliceroid matter. Occasionally one part of the tumor exhibits the brain-like character, while another is strictly hematoid, or composed of a mixture of blood and encephaloid." Delicate osseous spiculæ and small fibro-cartilaginous formations are also frequently found imbedded within its substance. As the disease progresses, the dense and outer layer of the bone becomes perforated and ultimately absorbed. The integuments, traversed by blue and tortuous veins, finally become implicated in consequence of the continued pressure exerted upon them, and, ulcerating, permit the morbid mass to protrude. At this stage, fracture is particularly liable to occur; the lymphatic glands enlarge, and a cancerous cachexy ensues, followed by a fatal termination of the disease.

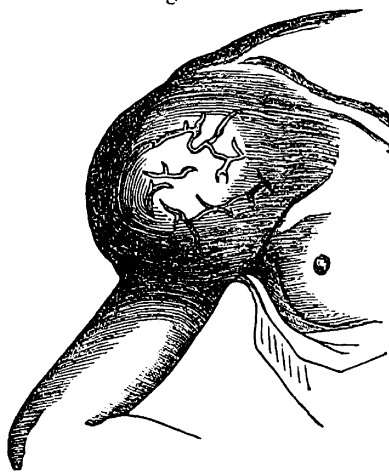
Encephaloid may, however, occur as an infiltration, in which case no distinct and circumscribed tumor is formed.

Symptoms.—The symptoms accompanying the development of encephaloid are not such as enable the surgeon to determine, with any degree of certainty, the real nature of the difficulty, until the tumor has become of considerable size. In general, however, the tumor will be found to progress rapidly, producing sharp, lancinating pain; will be lobulated in form, and of varying degrees of consistence in different parts, and confined, for the most part, to the

articular extremities of the long bones. It will also exhibit more or less tension, with elasticity, while the veins traversing the integuments will be found tortuous, blue, and distended; Fig. 221. The neighboring tissues are speedily contaminated, the contiguous lymphatics become enlarged, and the peculiar cancerous cachexy, so indicative of this disease, sets in. So long as the disease is confined within the walls of the bone, it develops itself but slowly, and does not show much disposition to affect the constitution; but when once the soft parts become implicated, its progress becomes rapid, and the patient soon sinks under the constitutional trouble it produces.

Treatment.—The remedies recommended under the head of Cancer in the Soft Parts are also of more or less utility in the management of this affection. Too often, however, all remedial agents save the knife fail in producing any decided curative action. Even amputation and excision are not very promising of permanent benefit, as it is well known to all surgeons who have had any experience in the treatment of this disease that there are few forms of cancer in which the affection so speedily returns as in that of the bones. The earlier surgical interference is had, the greater is the prospect of permanent relief; if the glands are involved, and cachexy has occurred, there is little hope of success in an operation. If amputation is determined upon in the early stages of the disease, the point of election at which the removal is to take place materially governs the prognosis in the case. The rule is to amputate at or above the next joint: in case of the femur being attacked, at the hip-joint; if the bones of the leg, in the thigh; when the forearm is affected, in the arm; and when the arm is the point of disease, in the shoulder. The propriety of *excision* of certain bones of the face will depend entirely upon whether the morbid deposit is limited to the structure that can be

Fig. 221.



Osteo-cephaloma of the head of the humerus, with spontaneous fracture of the shaft.

excised. As a general rule, excision is not applicable to the removal of malignant tumors, owing to the fact that the neighboring soft structures are too much implicated to justify this procedure.

The internal treatment will be in all respects similar to the treatment of cancer in the soft structures, to which the student is referred for details.

Colloid.—This variety of cancerous deposit stands next to encephaloid in point of frequency of occurrence. Like the latter growth, it is capable of attaining immense size, but, unlike it, is generally very tardy in its progress. It is frequently met with in connection with disease of the bone, commonly known as osteo-sarcoma and spina ventosa, which presents an irregular osseous framework, the cavities being filled with a jelly-like substance. The surface of the tumor is lobulated, the subcutaneous veins more or less augmented in size, the pain lancinating; while in the latter stages of the disease the lymphatic glands become enlarged and indurated.

An interesting case of this disease came under the treatment of Prof. Gross in the Louisville Hospital, in 1844, in which a colloid tumor grew from the body of the sphenoid bone, outside the dura mater. The patient died at the age of thirty-nine years, from epilepsy produced by a fall twelve months previously. The autopsy revealed a lobulated tumor of irregular form, about the size of a pullet's egg, which had flattened the variolian bridge, and evidently produced the disease which caused the patient's death. A section of the morbid mass showed it to be composed of several compartments communicating with each other, and occupied by a white, semi-concrete substance, in all respects similar to that of colloid.

Treatment is the same as in colloid cancer in the soft tissues, to which the student is referred.

Scirrhus of bone rarely occurs. When present, however, it is found developed in aged persons, and generally coexists with a like deposit in some of the soft structures, as the mamma or uterus. It may occur as an infiltration, occupying the cancellated structure of the bone, in which case it sustains a close resemblance to fibro-cartilage in color and consistence; or as a distinctly-circumscribed tumor, of a rounded, oval shape, yellowish or greenish-white in color, dense and unyielding in structure. Several tumors are occasionally found in the same bone, in consequence of which the latter becomes more or less absorbed and extremely liable to fracture.

Melanosis.—This variety of deposit may be situated upon the surface of the bone, in the spongy structure, or in the medullary canal, and is generally found developed simultaneously in several organs of the body. It may occur as an infiltration, or as small firm masses or nodules. Its favorite seat is the femur and tibia, though it is rarely met with even in these bones.

Treatment.—The treatment of these several varieties of cancerous disease in bone will be considered under one general head. The benefits accruing from the use of internal remedies in cancer involving the bony structure have availed but little, although an isolated case or two may be found in the recorded experience of homœopathic practice in which more or less advantage has been claimed from the use of the medicines already referred to in the treatment of cancerous growths in the soft structures. In all cases of this disease, whenever the morbid growth can be accurately determined by the existing symptoms, the internal medication generally will be the same as previously shown in the treatment of cancer in the soft structures. If, after a careful and systematic course of treatment, the remedies for cancer are of no avail, our only resource is either resection or amputation. These operations are, however, not very promising, as cancer affecting the bones is more liable to return, and indeed with even greater rapidity than when involving the soft structures. "In all cases of encephaloid of the extremities," says Gross, "that I have either operated upon myself or seen operated upon by others, there has been a speedy recurrence of the disease, often indeed in less than three months, either at the cicatrix, the neighboring lymphatic ganglions, or in some internal organ, carrying off the patient a short time afterward. I am aware that exceptional cases are sometimes reported as cured; but they are only exceptional, and nothing more, to say nothing of the fact that there may occasionally be in these cases an error in diagnosis—the tumor, although possessing some of the outward properties of osteo-cephaloma, being in fact only a benign one, appertaining to the osteo-sarcomatous class of the older writers. Judging from personal observation, I am inclined to believe that malignant growths of the maxillary bones are less liable to relapse after operation than those of any other portions of the skeleton; and in this view of the subject, if I mistake not, the opinion of prac-

tioners generally coincides. Nevertheless, even here the ultimate issue of the case is nearly always unfavorable."

In regard to the choice of the operation, as to whether it should be amputation or excision, the decision must always be given in favor of the former. Whenever the morbid growth occupies an extremity, the removal, to promise the greatest safety, should be effected as high up, or as near the trunk, as possible. Thus, when the hand is involved, the forearm should be cut off near the elbow; and in encephaloma of the radius and ulna, the limb should be amputated pretty closely to the shoulder. If the tumor be seated in the upper jaw, the whole of that bone should be excised, together, perhaps, with portions of the palate, spongy and malar bones. Thorough work must be made, or interference will be productive of infinite harm. If recovery should take place after an operation of this kind, the patient should be placed under a complete dietetic and hygienic regimen, and those remedies given that exercise a curative influence over the diseased condition.

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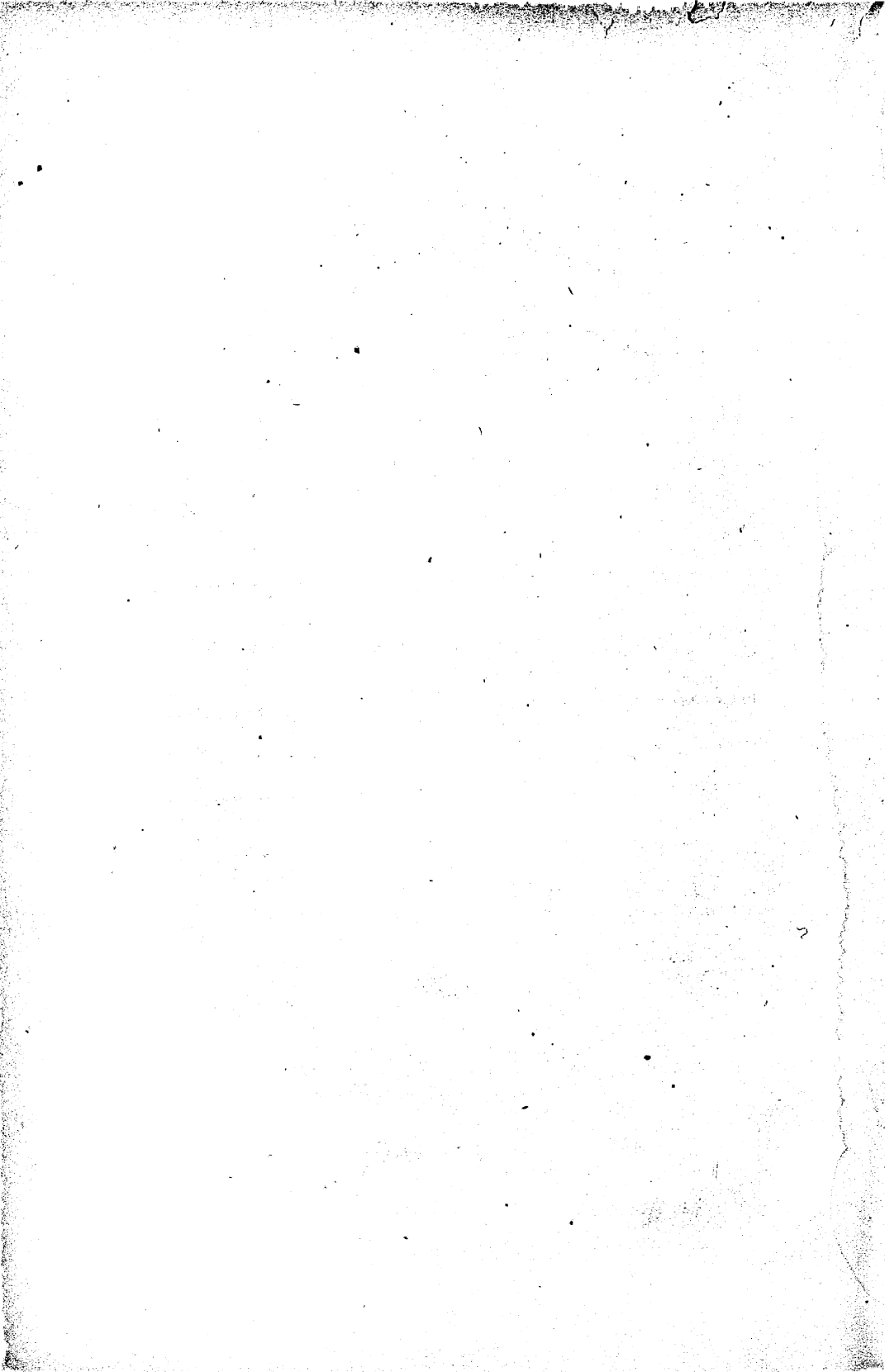
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
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
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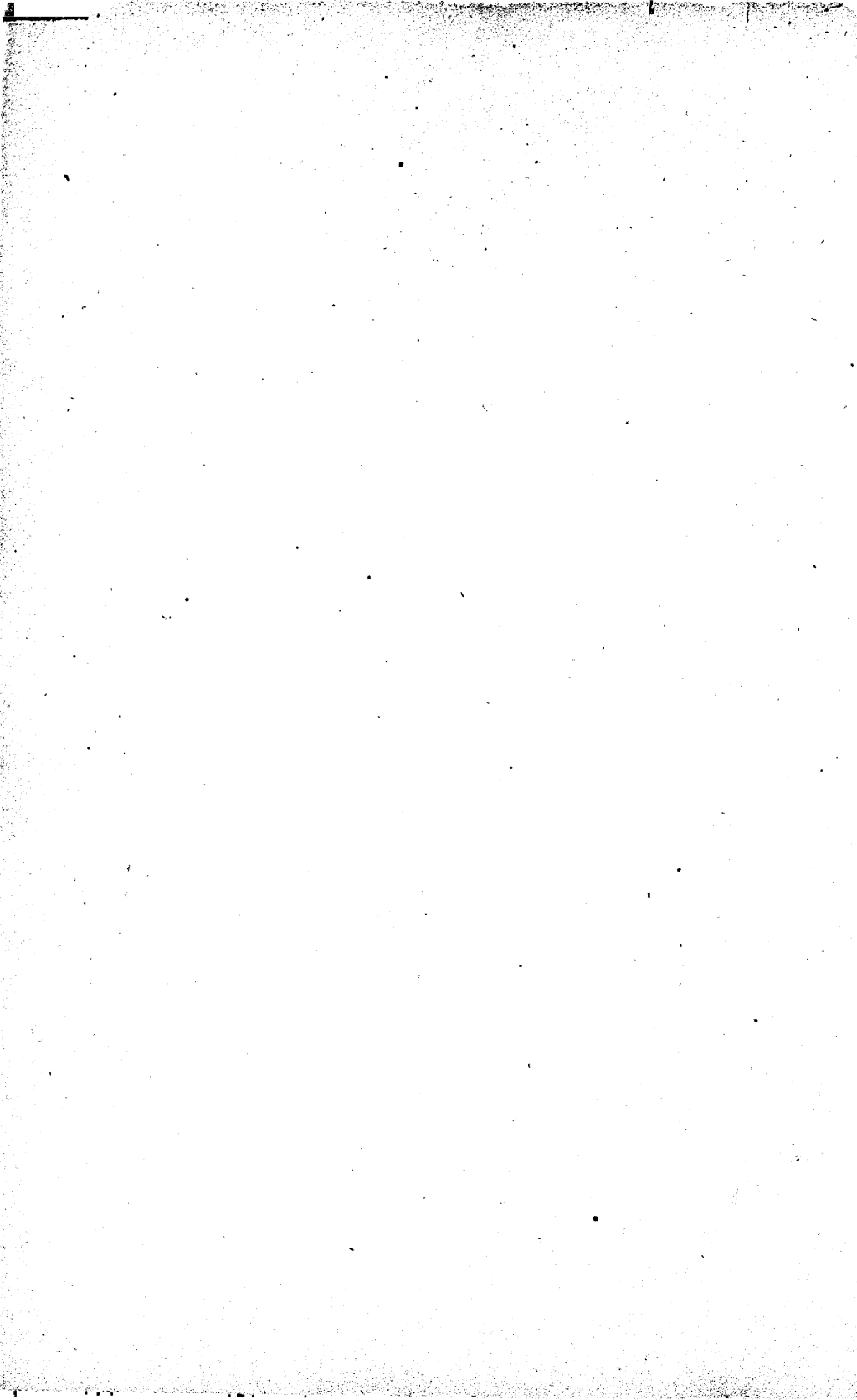
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